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ART. XXXIX.—ON MELIA AZEDARACH.

By R. Egleseld Griffith, M. D.

Nat. Ord. Meliaceæ.

Sex. Syst. Decandria Monogynia.

Melia: *Calyx*, five-parted, small: *Petals* five. Lepanthium cylindric, ten-toothed, dentures bifid at the points, orifice internally antheriferous. *Style* cylindric; stigma five-rayed; *Drupe* globose; nut five-celled, five-seeded.—*Nuttall.*

M. Azedarach. Leaves bipinnate, leaflets smooth, ovate, dentate.—*Lin.*

Synon. M. Azedarach. Lin. Sp. Pl. 550. Willdenow. Sp. Pl. II. 558. Nuttall. Gen. Am. Pl. I. 276. Michaux. Arb. Forest. III. 4. &c.

Azedarach. Dodon. Pempt. 848. Brown. Zeyl. 40. Raii. Hist. 1546. Parkin. Herb. 1443.

Arbor fraxini folio, flore cœruleo. Bauhin. Pin. 415.

Azadirachta indica, folios ramosis minoribus, &c. Comm. Hort. 1, 147.

Azedaraca. Tourn. Institut. Adanson.

A. amæna. Rafinesque. Med. Flor. U. S.

A. deleteria. Moench.

Pseudo Sycamorus. Cam. Epit. 181.

Zizypha candida. Ger. 1306.

Icon. Cavanilles. Diss. t. 207. Hort. Cliff. 161. Camer. Herb. 103 f. 2. Lamark. Illus. Ency. Met. t. 252. Michaux. arb. Forest III. 1. Bot. Mag. t. 1061.

Officinal. Bark of the Root.

Description.—Tree thirty to forty feet in height, spreading. Bark scabrous, roots horizontal, rather superficial, extending to a considerable distance. Leaves large, alternate, bipinnate, each pinnule with five to seven, opposite, lanceolate acute, dentate leaflets. Flowers odorous, of a light violet or pink colour, forming a drooping panicle, springing from the axil of the upper leaves. The calyx is very small, and having five obtuse, slightly pubescent lobes. The petals are much longer than the calyx, spreading, oboval and obtuse. The stamens are united into a tube, which is rather shorter than the petals, dilated at its base, of a dark violet colour, and ten-toothed, but each division being bifid, it appears twenty-toothed, except on close inspection. The anthers which are bilocular, alternate with the dentures of the tube, and are attached on its inner surface. The ovary is globular, surmounted by a thick style, which is terminated by a small stigma, which is five lobed or rayed. The fruit is a fleshy berry of an ovoid shape, about the size of a cherry, and containing an elongated nut which is five-celled and five-seeded.

Habitat.—The Pride of China is a native of many parts of Asia, but has been long naturalized in the southern countries of Europe, from whence it was introduced into the United States at an early period after the settlement of Carolina and Georgia, where it has become as common as if originally a native. It succeeds perfectly well as far north as Virginia, and will sometimes survive for a few years in Pennsylvania, but is most generally destroyed by the severity of the winters, even when by care and protection it may have attained a large size.

Rafinesque states that it is a native of Arkansas and Texas, but does not give any authority for the assertion; and as all other writers on American plants unite in declaring it to be of foreign origin, it is likely he has been led into error, by finding some individuals in uncultivated situations. This, it is well known, is by no means a certain guide as to whether a plant is indigenous, as most of the naturalized species

are to be found in the most secluded spots. In the case of the melia, the seeds are widely dispersed by birds, some species of which, as the robin and mocking bird, feed eagerly on the berries.

Botanical History.—The genus Melia derives its name from the resemblance of the leaves of its principal species to those of the ash, Melia of the Greeks. It belongs to the natural order of MELIACEÆ, which contains many species possessing medicinal properties, though by no means of an identical character.

The Melia has long been known to botanists, and was described by the earlier writers under the name of *Azedarach*, which was unnecessarily changed by Linnæus to that it at present bears. It appears to have been introduced into Italy, from Syria, after the conquest of that country by the Romans, as Pliny speaks of it as by no means uncommon, and was apparently acquainted with its narcotic properties.

Medical History.—The early medical history of this plant is involved in much obscurity, for although as just stated, Pliny would seem to have known that it was possessed of deleterious and narcotic qualities, the first certain account we have of it is by Avicenna, (lib. iv.) who says that its leaves and branches are very poisonous to animals; this statement, however, is erroneous, as will be noticed hereafter. In the United States it was early resorted to as an anthelmintic, and was at one time in considerable repute. Dr. B. S. Barton had a high opinion of it, and it was favourably spoken of by D. Duvall, who made it the subject of his inaugural thesis in 1802.

Medical Properties and uses.—The most efficient part is the bark of the root, which has a bitter, nauseous taste, and unpleasant, virose smell. Its active principle appears to be volatile, as it is is much more efficient in the fresh than in the dried state. It possesses marked anthelmintic powers, and in large doses is narcotic and even emetic. As above noticed, Dr. B. S. Barton, who gave it an ample trial, says, it is one of the most valuable anthelmintics ever discovered;

and Dr. Kollock, of Georgia, uses the following language with regard to it: "It is a vermifuge of efficacy. Its use is in some measure general among the planters, and with many supercedes the use of all others. I have given it with success, where all others in common use have failed of relieving. But when given in the months of March and April, while the sap is mounting into the tree, it has sometimes been followed by stupor, dilatation of the pupil, stertorous breathing, &c. But these symptoms, like those sometimes produced by Spigelia, pass off without any perceptible injury to the system." This article he goes on to state is also applicable in the same manner as the pink root to those febrile affections of children, resembling the irritative fever often accompanying the presence of worms.

Dr. Duvall also gives much corroborative testimony in support of the efficacy of this remedy, not only in cases of Lumbrici, but also where Tæniæ are present. In Cochin China, according to Ainslie, (*Mat. Ind.*. ii. 455,) it is well known to the native practitioners, by the name of *din*, *oots* or *sedan*, and used as an anthelmintic, but is administered with great caution; quia nimia dosi vertigeriem et convulsiones affer[illegible] (*Louriero; Flor. Coch. China*, i. 269.)

The leaves are likewise endowed with some activity; in the *Dict. Univer. des Plantes* it is stated that a decoction of them is eminently purgative, but this does not appear to be supported by the experiments of Dr. Duvall, added to which horses and cattle feed on them, with perfect impunity; in all probability, they will be found very analogous to those of the *M. azadirachta*, which are astringent and tonic. Dr. Skipton of Calcutta, has used the latter with the happiest success in hysteria, (*Trans. Med. & Phys. Soc. Calcutta*, i. 123.)

The berries, which are sweetish, are said by Dr. Kollock to be anthelmintic, though only in large doses; in some cases, however, they cause unpleasant effects; thus M. Tournon gives a case in which convulsions and the most copious vomiting and purging were produced by the ingestion of two or three of them. (*Journ. Gen. de Med.* xlviii. 25.) They fur-

nish much oil on expression, which is used as an anthelmintic by the Javanese, and is also much esteemed as an external application to foul ulcers, and as a liniment in rheumatic and spasmodic affections. Michaux states that an ointment prepared with the pulp is employed in Persia, in cases of Tinea capitis and other obstinate cutaneous affections.

Pharmaceutic Preparations and Mode of Administration.—As an althelmintic, the bark of the root may be given in substance in doses of gr. xx. The usual form, however, is that of a decoction made by boiling four ounces of the fresh root in a quart of water, till the menstruum is reduced to a pint, this is given in doses of half an ounce every two or three hours, till it produces the desired effect. It is also given night and morning for several successive days, followed by an active cathartic.

Dr. Duvall is of opinion that the neatest and most efficacious mode of exhibition is in form of a tincture, but general experience has not confirmed the validity of his suggestion.

Analysis.—No correct chemical examination of the azedarach has been made; from the imperfect analysis of Dr. Duvall, it would appear that the active principle is soluble both in water and alcohol.

Economical Uses.—The wood of the Pride of China is very durable, and is applicable to many uses. Michaux considers that it would supply the place of elm, for every purpose to which that wood is applied.

The nuts are used in the south of Europe for rosaries, for which purpose they are well suited, from having a natural perforation through the centre, and being susceptible of a high polish. Owing to their employment in this way, the tree has been called *Arbor sancta*, and by the Spaniards *Arbol Parayso.*

The pulp or pericarp furnishes an oil, and the whole berry is fed upon by birds, but according to the observations of Dr. Duvall, does not appear to be nutritious, as however freely they may be eaten by the species using them for food, they never become fat, and their flesh acquires a strong and disagreeable taste.

Besides the above, there are four other species of Melia, all natives of the East Indies, the most important of which is the *M. azadirachta* or Margosa tree: this species is very closely allied to the azaderach, in many particulars, and it is often confounded with it by writers on Materia medica. The bark of this is bitter and astringent, and is considered by the Hindoo practitioners, as one of their most valuable tonics, giving it for almost every purpose for which cinchona is prescribed with us. The tree furnishes much gum, somewhat analogous to gum arabic. The flowers are supposed to be efficacions in cholera morbus, and a sort of toddy is obtained from the young trees, which is prescribed as a stomachic, an ounce and a half being given every morning.

Dr. Piddington, of Calculta, has obtained an alkaloid from it which he termed *Azadirine*; this principle is white, and crystalizes in small brilliant prisms; in all probability, the *M. azederach* will be found to owe its remedial properties to the same substance: the process for procuring it is much the same as that for Quinine.

ART. XL.—PHARMACEUTICAL NOTICES—No. 11.

Impurity in Hydrargyrum cum Creta.—It is a matter of sincere regret that we are so frequently called upon to notice the wilful sophistication or accidental impurity of medicines, as it conveys an implied stigma upon the character or skill of fellow labourers in the same cause. But having determined to expose every case which comes to our knowledge, in order that those who are conscientious in the discharge of their duties, may not be deceived by the faults of the adulterator, or the carelessness of the unskilful, we submit the following remarks from our note book. 1835—*June.*

Complaints having been made of the quality of *Hydrargyrum cum Creta,* procured from a respectable establishment in this city, and a small portion of it having been submitted to us for examination by Professor Dunglisson, on account of its effects having been very violent, in a case in which he had prescribed it, we were led from a cursory examination of this specimen to suspect an important impurity, and hence procured a large portion in order that we might correctly determine to what cause such effect was to be attributed.

Physical properties.—The specimen examined bears Mauder, Weaver and Mauder's label, and is of a deep bluish or rather brownish colour, essentially differing from the colour of that prepared according to the U. S. Pharmacopœia. It is not perfectly triturated, having small white specks diffused through it. Sp. grav. 2.120. It appears to be made with a precipitated oxide of mercury, instead of, by trituration, with metallic mercury. Its taste is sensibly metallic, nauseous, and coppery, very persistent, although this is not perceived when first taken into the mouth. When washed with water, in order to separate the chalk, a few small globules of mercury are left with the oxide. In the process of washing, the chalk, which is suspended in the water, flows over the vessel quite blue, indicating that it is not completely separated from the oxide.

Chemical Examination—To a portion of the oxide remaining after the chalk had been washed away as above, very dilute acetic acid, was added guttatim. Digestion was carried on in the cold for about two hours, when a solution of hydriodate of potassa added to the solution, gave an immediate precipitate of periodide of mercury, thus indicating promptly the presence of a salt of the *per* oxide of mercury, in the solution.

Another portion of the Hydrargyrum cum Creta, was dif fused through water, and acetic acid added, cautiously and by single drops, until effervescence ceased. After digestion in the cold for one or two hours, solution of hydriodate of potassa, gives a red, and pure potassa an orange yellow precipitate, conclusive evidence of the existence of *per oxide of mercury* in a preparation which is administered to the most delicate stomachs on account of its mildness, and reputed character of possessing less irritating properties, than calomel or any other preparation of mercury!!

A whitish powder, or precipitate, is formed during the digestion in acetic acid, which becomes yellow when water is poured on it. This may be a *sub acetate of mercury*, as such a salt is mentioned by Thompson, to which this property is ascribed.

Every precaution was taken in the above experiments to prevent the formation of per oxide during the process, and we feel confident that such an effect could not have been produced. How the per oxide happened to be present, we cannot of course explain; but we think it may have been occasioned by one or the other of the following causes:—either that the oxide when precipitated was heated, to hasten its drying, or it was precipitated from some acid, which had a disposition to furnish oxygen to the metal, and thus formed a combination of a *per*, and *proto* salt at the same time.

Having had occasion subsequently to the above experiments, to precipitate the oxide from a sulphate of mercury, we observed that the colour of the oxide thrown down by potassa, bore a strong resemblance to that of the oxide left by the washing, from the Hydrargyrum cum Creta, under ex-

amination. The discovery of this impurity, with that of numerous others detailed, in late numbers of the Journal, are powerful incentives for the adoption of the universal practice among those engaged in dispensing medicines, of preparing their own pharmaceutical materials. Those who, from ignoance or neglect, or parsimony, refuse to adopt this rule, will inevitably fall behind in the race with their competitors, and pay the penalty, which the universal law of nature invariably inflicts, while they who pursue this course, with industry, capacity, and a certain knowledge, that what they dispense for the sick is pure, and the best of its kind, will as invariably secure to themselves an honourable standing, and a clear conscience, if although a pecuniary recompense may not reward their labours.

W. R. F.

Baltimore, Sept. 24, 1835.

Mercurial Ointment.—Several methods for making this valuable preparation have been given in former numbers of the Journal of Pharmacy, but none of them appear to have fulfilled the desired result. The following mode unites the great desiderata, in the most efficient manner. A few pounds of mercury and pig's foot oil were introduced into an iron bottle, which was well closed, and attached to the frame of a saw, at a saw mill in full operation. After it had been subjected to the violent agitation necessarily resulting from its situation, for about six hours, it was removed and examined. The result was a well formed and homogeneous ointment, of good consistence and colour.

C. D. B., *Cincinnati.*

ART. XLI.—ON THE IONIDIUM MARCUCCI.

By R. Egleseld Griffith, M. D.

Some of the natural orders of plants are remarkable for the identity of the medical properties of all the individuals composing them; this is strongly exemplified in the Violaceæ, all of which are more or less emetic, particularly in those species found in tropical climates.

The genus *Ionidium* may be considered as the type of the order in this respect: the roots of all the species being emetic or emeto-purgative in an eminent degree, as has already been adverted to in a former volume, (*Journ. Philad. Coll. Pharm.* iii. 192.) These roots, although in general use, and high estimation in their native countries, have not attracted much attention elsewhere, though many of them are fully equal to Ipecacuanha, as remedial agents, and some are endowed with properties of a high order.

This would appear to be the case with the subject of the present notice, the *Ionidium Marcucci*, Bancroft, for specimens of which as well as the following information respecting its therapeutic properties, we are indebted to Dr. Mutter.

Ionidiun Marcucci. Suffruticose, procumbent, branching; branches with two lines of pubescence; leaves alternate, ovate, cuneate at base, serrate, serratures glandular at tip; stipules ovate lanceolate, rather longer than the petioles; sepals ovate, acute; lateral petals falcate, upper petal widely obcordate, lower twice the length of the calyx: peduncles, marked with a pubescent line, longer than the leaves; capsule sphero-trigonal; seeds ovate globose, with a concave truncation at tip, shining brown.

This species of Ionidium is a native of Quito and was imported into Maracaibo, by Mr. Marcucci. His attention was attracted to it by observing that it was employed by the indians near Bogota, for the cure of cutaneous affections. They termed it *Cuichunchullo.* Specimens of it were transmitted to Dr. Bancroft, of Jamaica, who drew up the above specific description, and dedicated the species to Mr. Martucci.

It has been employed in Maracaibo, in Elephantiasis, with the most marked benefit, in doses of ½ drachm in substance or infusion, every two or three hours, in the course of 24 hours, a copious flow of urine and numerous alvine evacuations are produced. In a short time all the symptoms of this terrible and loathsome disease rapidly decline, and the natural functions of the skin are restored.

Although its full powers and true efficacy have not been fully tested, it has been considered of such importance and value, that the Congress of Venezuela have passed a decree, to encourage a search for it.

It is evident from the above, that the *Cuichuncullo* closely resembles the *Madar* of the East Indies, in its medicinal properties, but is more certain and prompt in its effects. Should it on a more extended trial, be found beneficial in the hitherto intractable disease, in which it has been used, we have every right to expect much from its powers in other obstinate cutaneous affections. It richly deserves the notice of the medical profession, and should be fully and carefully experimented upon.

ART. XLII.—MEDICO-BOTANICAL NOTICES.—No. VII.

Adansonia digitata.—Monkey bread or baobab. This extraordinary tree which attains a greater size as regards the diameter of its trunk, than any other known vegetable, is a native of Senegal. It is said to be also found in Egypt and Assyria, and a single tree has been propagated in the Island of St. Vincent. The first correct account of it was given by *Adanson*, since which several descriptions have been drawn up by travellers, the latest of which is that by Mr. G. Bennett. (*Wanderings in New South Wales.*) He states that a tree

which he saw in the Cape de Verd Islands, measured forty feet in circumference, and was about sixty feet high. Adanson, however, says that the diameter of the trunk is sometimes thirty feet. The bark is smooth and of a grayish colour, the branches are of a great size and terminate abruptly, and from these truncated extremities the smaller branches are given off. The fruit which is attached to a long, twisted, pendent foot stalk, varying in length from one to two feet, is of an oval form, about six inches in length, and three or four in circumference, rough externally, and when mature, of a brownish yellow colour; on the outer shell being broken, Mr. Bennett found that it contained not the yellow pulp usually described, but a white farinaceous substance, enveloping the dark brown seeds, and of an agreeable acid taste. Mr. Bennett, it is evident, examined an old and withered fruit, as all other observers agree in stating that at first the fruit contains a pulpy substance, which becomes farinaceous on drying.

The young leaves dried and reduced to powder, are much employed by the negroes under the name of *Lalo*, to mix with their food; they are of opinion that a constant use of this condiment tends to diminish the excessive perspiration to which they are subjected, and Europeans have found it useful in cases of diarrhœa, &c.

The juice expressed from the fruit is used as a lemonade in the fevers of the country. (*Hooker. Bot. Mag.* 2792.) The dried pulp mixed with water is considered to be efficacious in dysentery, and from the experiments of Dr. L. Frank, it would seem that its virtues have not been overrated. (*Delile. Cent.* 12.) From the analysis of Vauquelin, it appears that this pulp is composed of a gum, resembling gum arabic, an acid analogous to the malic, sugar like that of the grape, starch, &c.

The fruit forms an object of commerce in Africa, and is conveyed to great distances. If it be injured or decayed it is burned, and the ley of the ashes boiled with palm oil, to form a soap.

Sago.—Dr. Hooker, (Bot. Mag. 2827,) in speaking of the *Cycas circinalis* says, "it is a native of the East Indies, and

especially of the Mollucca Islands, where the fruit is eaten, and where a substance is said to be taken from the stem, resembling the Sago produced by trunks of many palms. But this is probably a mistake; at any rate, it is by no means from this tree, as some have supposed, nor from any species of *Cycas*, that the Sago of the shops is produced, but from a species of *Sagus*, a true palm, though from what particular species, or whether from any one exclusively, does not appear to be ascertained." He goes on to say, that when RHEEDE speaks of the Sago produced from the *Todda panna*, he evidently confounds some Japanese palm which produces Sago, with the *Cycas circinalis*.

Dr. HAMILTON is of opinion that the *Sagus genuina*, RUMPHIUS (the *S. inermis*, ROXBURGH; *S. Rumphii*, WILLDENOW,) yields the best Sago, and the *S. farinifera*, LAMARCK, the worst.

Xanthorrhea hastile, or yellow gum of New South Wales, is, according to Mr. Bennett (o. c.) a shrub of eight to ten feet in height; the trunk is surrounded by two or more heads, each bearing a flowering stem, which rises from the centre of the foliage to the height of six feet or more. This scape terminates in a cylindrical spike of small white flowers, succeeded by triangular capsules containing three black seeds in distinct cells.

It secretes a yellow gum resembling gamboge, being externally of a dull yellow appearance, but breaking with a bright yellow fracture. When heated it volatilizes, diffusing an agreeable odour resembling frankincense. It exudes from the trunk in very small globules, and is formed in very thin layers about the petioles of the leaves. There are several species, all of which furnish an analogous product.

Cedrela odorata.—Among several interesting articles of the materia medica, &c. lately brought to this country by Mr. R. de la Sagra, director of the botanic garden of Havana, were several masses of a gum derived from the *Cedrela odorata*, or Spanish cedar, the wood of which is so extensively used for segar boxes. This wood, as is well known, has a disagreeable and somewhat nauseous odour, apparently depending on

a peculiar resin. The gum, which from the size of the masses must be furnished in considerable quantities, is of a dull yellowish white colour, and closely resembles gum Senegal in fracture and lustre, it is insipid, and soluble in water in almost every proportion, forming a consistent tenacious mucilage, and might be used for every purpose to which gum Senegal is used.

Cerbera Tanghin.—The fruit of this plant, a native of Madagascar, is the most virulent vegetable poison with which we are acquainted. The kernel is not larger than an almond, and yet is sufficient to cause the death of twenty persons. Dr. Hooker, who has given a representation of the plant in the Botanical Magazine, 2968, states on the authority of Mr. Telfair, a resident of the Mauritius, that it was formerly used by the kings of Madagascar, as an ordeal, and that its ingestion in the small dose above spoken of, was attended with the following symptoms: On some persons it begins to operate in half an hour or less. Convulsions ensue, accompanied with nausea; when vomiting occurs at an early period, recovery generally follows; this however is seldom the case. The Cerbera belongs to the natural order, Apocyneæ, and produces a wood, which, from its hardness and beauty, is well suited for cabinet work.

Cocculus Palmatus. Notwithstanding the unwearied labours of botanists, and the rapid improvements and discoveries that have been the necessary result, much remains to be done in the elucidation of the true origin of many articles of the vegetable materia medica. It is especially remarkable that till within a very recent period, we have known least respecting the plants furnishing the most important and most generally employed of these articles, as Ipecacuanha, Jalap, Rhubarb, &c.

The subject of the present notice has been known under the name of Columbo, for a very long period, and it was early ascertained that it was a product of some part of the East Indies, but its exact habitat and the plant from which it was derived, remained involved in great obscurity.

Commerson, during his residence in the Isle of France, gathered some specimens of a plant, which he designated as

"*Columbo*, in Indiis *vocatum*." These were described by LAMARCK, under the name of *Menispermum palmatum*, and he further suggested that it might be the true Columbo. There the matter rested until 1811, when Dr. Berry gave an excellent description of a figure of the male plant, in the tenth volume of the Asiatic Researches. He states that it is abundant in the dense forests of Mozambique, &c., on the east coast of Africa. The roots are dug up in March. The main root is not removed, but the offsets from the base taken. These are cut into slices, strung on cords and dried in the shade. It is deemed of a good quality, when on exposure to the sun, it breaks short, and to be unfit for commerce when it is soft and black. It is in high repute among the natives as a remedy in almost every disorder. They term it *Kalumb*, whence the name under which we know it.

The latest and fullest account we have of this important article, is that by Dr. HOOKER, in the Bot. Mag. 2970, 2971, who there describes the male and female plants accompanied with excellent representations, under the name of *Cocculus palmatus*. He derived his information from Mr. TELFAIR, of the Mauritius. The root according to this gentleman, is perennial, composed of a number of fasciculated, fusiform, somewhat branched, fleshy, curved and descending tubers, of the thickness of an infant's arm, clothed with a thin brown epidermis, marked towards the upper part especially, with transverse warts; internally they consist of a deep yellow, scentless, very bitter flesh, filled with numerous parallel, longitudinal, fibres or vessels.

The fruit is drupaceous, or berried, about the size of a hazel nut, densely clothed with long spreading hairs, which at the extremity are tipped with a black gland. The seeds are sub-reniform, clothed with a thin black shell, transversely striated.

Monodora Myristica. According to information transmitted by Dr. BANCROFT, of Jamaica, to Dr. HOOKER, (Bot. Mag. 3059) a single individual of this tree exists in Jamaica, reported to have been brought from South America, though Mr. BROWN considers it more probable that it was introduced by the negroes from Africa. The fruit was described by GÆRT-

NER, under the name of *Amona myristica.* LONG, (*Hist. Jam.*) says the seeds are impregnated with an aromatic oil, resembling that of the eastern nutmeg, from which they differ so little in flavour and quality, that they may be used for similar purposes in food and medicine; the only perceptible difference to the taste being that they are less pungent than the East Indian fruit.

Myrobalans. In the various changes and revolutions which have occurred in the science of medicine, many remedial articles formerly in the highest repute, and considered almost indispensable in the treatment of disease, have fallen into disrepute, or have been supplanted by others, perhaps of not as real efficacy. No drugs were in more general use, at one period, than the various kinds of Myrobalans. These are the unripe fruits of several species of *Terminalia* (*Myrobalanus,* GÆRTNER,) all natives of various parts of Asia. They were formerly employed as purgatives, and entered into most of the numerous theriacs and diascordiums then so universally employed as panaceas in almost every disease. They have now fallen into complete disuse, and even their name is scarcely remembered. It would appear, however, that in the East they still retain some of their former reputation, and are successfully employed in diseases of the bowels.

We sometime since received some specimens of a drug from Syria, which on examination and comparison with the figures of the Myrobalans, given by CLUSIUS and GÆRTNER, proved to be *Myrobalani chebula* and *Indicæ,* or fruit of the *Terminalia chebula.* They are of a black colour, of an ovoid or irregularly oblong form, about the size of a small olive, and longitudinally straited. Their fracture is resinous, compact, of a brown black colour, and seldom presenting more than the rudiments of a nut. Their taste is bitter and very astringent, resembling that of the unripe persimmon.

Their Arabic name is *Hindy Sheirif.* A tea spoon of the powder is given at a dose, to be administered when the patient is perfectly free from fever; he is to abstain from solid food for a few days; if the case be obstinate, a second dose always proves successful. It is also employed in powder or decoction for sore mouth. R. E. G.

Selected Articles.

ART. LXIII. OBSERVATIONS ON THE CRUSTA GENU EQUINÆ, (SWEAT OR KNEE SCAB, MOCK OR ENCIRCLED HOOF KNEES, HANGERS, DEW CLAWS, NIGHT EYES, OR HORSE CRUST,) IN EPILEPSY. By John S. Mettauer, M. D. of Prince Edward County, Virginia.

The grounds upon which this new agent rests, for at least a favourable consideration of its claims upon the profession are, its successful employment in the cure of some forty or fifty well-marked cases of epilepsy.

The substance designated by the several appellations at the head of this article, is furnished by the horse; four oval surfaces, situated on the inner aspects of the extremities, near the knees, are the parts of the animal from which it is obtained. The secretion is poured out so gradually, and in such small quantities at a time, as not to be observed in its fluid, or even semi-fluid states. The crust is of variable colour, as well as density; its exterior is always of a lighter appearance, and harder than the interior, which is dark and soft; it is of a lamellated and fibrous texture, and when broken, resembles dark, soft horn; its odour is very penetrating, diffusible, and peculiar; it is deciduous, and separates gradually two or three times during the year; when prematurely or forcibly removed, the surface from which it is taken, sometimes bleeds a little, inflames, and becomes tender and sore.

Our investigations in relation to the peculiar function of the surfaces, or the offices they subserve in the economy of the animals themselves, do not enable us to say much, if any thing on this subject. Nothing certain seems yet to have been ascertained as to their uses. Conjecture and an extremely vague and loose tradition, afford the only explanations. The sur-

faces have been supposed to separate and eliminate from the system, a fluid possessing many of the constituents of sweat, and loaded besides with properties peculiar to itself, which, if detained, deteriorates the health of the animal. The constant and regular discharge of this fluid, has been thought necessary for the perfect health of the animal, in promoting a sound state, more especially of the extremities, after-heels, hoofs and legs, all of which have been supposed to become diseased in some way by obstructions of the surfaces.

Emunctories somewhat similar, exist on the inner surfaces of the extremities of the swine, near the knees, which, if long obstructed, generally result in lameness and dragging of the posterior extremities; a secretion is continually distilling from them, which, like the crust of the horse, displays the peculiar odour or scent of the animal, more particularly observable when surprised or irritated.

As a *medicinal agent*, the crust has been long known in this part of the country. How it found its way into use as a remedy, is not certainly ascertained. It is conjectured that the coincidence of the horse being observed to bite the crust, and to pass worms from the bowels soon after, suggested it as such, and the conjecture is by no means improbable, when it is remembered, that this article was first employed as a vermifuge with that animal. The fœtid odour of the crust, it would seem, might naturally have suggested the idea of its possessing remediate powers, and doubtless did indicate it as a nervine and antispasmodic, after it was supposed to possess vermifuge properties.

We have long known and employed this substance as an antispasmodic; but the merit of introducing it into regular practice, is due to Dr. Joseph Mettauer, (the writer's father) who employed it in epilepsy, so early as 1782 or 1783. During the last twenty-five years we have enjoyed many, and satisfactory opportunities of using the crust as a remedy in epileptic convulsions.

In collecting the crust for medical purposes, it is necessary to attend carefully to its loosening tendency from time to time, or it may fall off and be lost. It may be made to separate

a little sooner by gentle solicitation, and occasionally by firm compression with a bandage. This should be suffered to remain on after the period of disquamation is near at hand, to prevent the accidental loss of the crust. After it is obtained, it should always be dried a short time in the shade, and then it may be kept for use in a close jar, to prevent, so far as possible, the escape of its volatile properties.

We have to regret our inability to furnish a correct, or even a tolerably satisfactory chemical analysis of the crust; from what has been ascertained, the urate of soda seems to be one of its principal constituents; we are inclined to believe that ammonia, in combination with perhaps the lithic acid, may also enter into its composition: from the peculiar compound odour which it often inhales, much resembles that emitted by common urine after standing some time.

Two forms for administration are only used—the powder and tincture. When the powder is to be used, it should always be freshly prepared, either by pounding and rubbing the dry crust in a mortar, or by grating it with a common nutmeg grater: this last process will be found, (generally,) most convenient, as it enables the practitioner to reduce it, at once, to a very fine and equable powder, even if the crust is imperfectly dried.

The tincture is prepared by simply digesting the broken or powdered crust in diluted alcohol, or common brandy, exposed to a gentle heat for eight or ten days in the proportion of one part of the former to four of the latter.

The doses of the powder vary from two to twenty grains; it may be given diffused in any liquid which the patient fancies. With young patients it is safest to begin with the minimum, and increase very gradually to the maximum doses. Should the disease yield before the largest doses are reached, no further augmentation need be made. When the tincture is employed, from 3ss. to ℥iss. are its extreme doses. Diluted with water and sugar, it may be given with very little difficulty to the youngest subjects, as it is tasteless, and in a great measure inodorous. In this form also, the doses should be very gradually increased, to prevent, as far as possible, the

danger of exciting the system too much, which might result from the menstruum, should the doses be suddenly augmented.

Possessing properties perfectly analogous to the crust, and employed with the same intention, and in nearly similar doses and forms, we will mention the parings of the hoof. In some cases it has been thought more efficacious than the crust itself. We have used it frequently in the form of tincture in the proportions of one part hoof to two of spirits, with complete success. A favourable result from the use of this remedy, (which we had prescribed in a case of epilepsy,) has been communicated to us since commencing this essay. Extreme doses, ʒj. to ℥ij.

The administration of the crust should always be preceded by a purgative or aperient. This step is designed to prepare the system for the action of the remedy, which it effects by unloading the intestines of vitiated secretions; increasing at the same time the nervous susceptibility of their mucous membranes to remedial impressions, and by determining from the head.

Aperients, or the milder purgatives, should be employed, and generally preferred in those cases of epilepsy distinguished by slight aberations in the animal economy; in such examples the pulse, bowels, and skin are very nearly in the condition of healthy organs; the paroxysms are short and transitory, succeeded by little or no coma, or even drowsiness. In cases marked by symptoms of greater violence, in which a decided inflammatory or congestive character predominates, cathartics should be used: to be varied in activity and strength in proportion as the symptoms partake more or less of acute characters; these are to be repeated until a decided impression is made. Cases of this latter description sometimes require V. S. also, and when this remedy is employed, blood should be always detracted from one or both of the external jugulars, if possible. Occasionally mercurials alone, or in combination with antimonials, are required.

In the first description, or milder cases of epilepsy, some preparations of rhubarb, or rhubarb itself, should be preferred. In the more violent cases, a combination of aloes, scammony,

and jalap, has generally been found most suitable; of each from two to five grains. Calomel with tart. antim. may be added, should the biliary secretion prove very defective, in proportions of two to four grains of the former, and one-fifth to one-third of a grain of the latter. These are to be repeated daily, or once in two days, until the circulation is balanced, the encephalic congestions in a measure dislodged, and the sympathies restored. These preparatory steps having been premised, the crust may be commenced with.

The form or preparation is to be determined by the peculiarities of constitutions, or the complications which modify the disease. Should the case occur in a constitution displaying a highly wrought sanguineous developement, the crust in simple powder will be most applicable, and should be preferred.

It will be safest to begin with the remedy at night, and as soon after the disturbances of the preceding paroxysms have subsided as possible. When given at night for the first time, it is more certainly retained by the stomach, and patients too, are less averse at this period of the day to the taking of an offensive remedy, very probably because the gastric organ is rendered less fastidious by the action of food and drinks upon it during the day.

With young subjects from six to eight years of age, two grains will, in a majority of cases, constitute the commencing dose. We have never used it with patients younger than six years, or older than thirty. Older patients, say from eight to twelve, or fifteen years of age, will bear four or five grains, or even larger doses in the commencement, and with such it may be more suddenly increased to the maximum doses, without gastric disturbances. The remedy rarely offends the stomach when the foregoing precautions are properly attended to; on the contrary, it seems rather to compose and tranquillize this organ. Three doses, in a majority of cases, are as many as will be required in the twenty-four hours. Should cases occur marked by convulsions of unusual violence, with frequent paroxysms, it may be given oftener. From many trials with this article, it has not been perceived that there is

much diversity of effect when employed in large or medium doses with young subjects.

Cases requiring the tincture, differ from those already noticed, chiefly on account of the more strongly marked developements, with which they are associated; in such examples of epilepsy, a decided hydropic diathesis not unfrequently obtains; the adipose textures generally, but more especially of the skin, are disposed to bloat a little, with universal pallidness and reduced temperature; the secretions from the skin, bowels and kidneys, are generally defective; the pulse is occasionally slow, feeble, and soft, but more frequently it is preternaturally active and corded, from the nervous mobility generally attendant upon imperfect sanguification; such patients are nearly always languid and sluggish, and often require diffusible stimuli to rouse the enfeebled energies, both of body and mind, to something like a comfortable state of excitation: with such subjects the approach of the paroxysm is more gradual, and may, in many instances, be foreseen for hours, and sometimes days. To this complication of epilepsy, the tincture is most happily adapted, as it presents the remedy in the form best calculated to act promptly, as well as to meet the several indications of cure. It should, (as advised with regard to the crust in substance,) always be commenced with at night, and in the minimum doses; from ʒss. to ℥iss. may be given, properly diluted, three or four times during the day. Being less permanent in its effects, the tincture should be given more frequently than the crust in substance, especially if the symptoms are urgent; these doses may be repeated with safety as often as once in three or four hours.

Occasionally in this form or complication of epilepsy, it becomes necessary to employ tonics, either mineral or vegetable, or perhaps both, before the tincture, (or powder,) can be given with the least benefit. By invigorating the organic tone, upon which the normal functional actions materially depend, (especially of the digesto-nutritive systems,) our agent is enabled the more effectually to produce its specific remediate excitation. That debility exists in these cases, may be inferred from the general anæmial aspect of such patients.

as well as from the marked benefits following the use of tonics. It is an observation worth remembering, (the truth of which has been often verified in the course of our practice,) that nervines rarely benefit when the organic tone is greatly depressed; like mercurials, they are more certainly remediate, under certain circumstances of energy of the organic vitality; depressed, (or exalted,) inordinately, both fail of their remediate effects.

Should costiveness supervene, (which will be often the case,) a combination of scammony, aloes, and rhubarb is to be used, in doses of from two to four grains of scammony, about the same proportion of aloes, and from four to eight grains of rhubarb, made into pills. This compound should be given at night, and the doses so managed, as to elicit only one or two evacuations, the design not being to purge freely. In restoring the solubility of the bowels, we know of no combination so well suited to such cases as the one just recommended; its action is gentle, but effective, particularly in eliciting the biliary secretion, upon which circumstance the peristaltic movements of the intestines are mainly dependent.

The crust, administered in either of its forms, should be suspended during the employment of aperients or cathartics; and should not be resumed, until, at least, the active cathartic movements subside. To correct the acidity which is occasionally present in this form of epilepsy, it has been found necessary to employ alkaline absorbents; and for this purpose a weak lixivium of hickory, or grape-wine ashes, has seemed to answer best: it should be prepared by mixing one heaping table-spoonful of the ashes in a quart of water; of the clear liquid, from ℥ss. ℥j. may be taken two or three times daily, after eating, or as often as may be found necessary, without irritating the bowels, which it will sometimes do if continued too long.

In both modifications of the disease, the diet should be particularly attended to during the whole course of the treatment, and indeed for some time after the cure may be supposed to have been effected. In the sanguineous variety it should be decidedly abstemious; animal or oily substances

are to be inhibited; cooked farinaceous articles; some of the soft pulpy fruits; molasses; and occasionally, thin animal broths will be found most suitable; very little food of any kind should be taken into the stomach after 2 o'clock, P. M. The epileptic patient should always retire to bed with the stomach nearly empty.

In the lymphatic complication, some latitude in diet may be allowed; that is, animal substances, moderately coagulated, and of a purely muscular character, may, (after the bowels are *regulated*,) be used in small quantities; should acidity abound, or a tendency to it in the stomach be discovered, the use of animal food is not only allowable, but particularly applicable.

As auxiliary means in the cure, the earliest attention should be given to uniformity of temperature; the skin should be well protected against the unequal action of cold, during every stage of the treatment; and for this purpose, the wearing of flannel next the skin should be directed. Thus protected, under all circumstances of climate and exposure, the individual may, (as it is requisite he should do,) indulge in moderate exercise, and even pursue many of his ordinary avocations, with comparative safety. This suggestion will not be regarded as supererogatory, when it is recollected, that epileptic attacks often originate in a want or neglect of comfortable clothing; and every practitioner much conversant with the disease must have witnessed relapses from exposure to the causes of catarrh.

The remedy which we have been considering should be discontinued or suspended upon the accession, and during the continuance of any new or acute diseases; and when resumed should be commenced within medium doses.

Employed in either of its forms, the crust should be continued perseveringly, until a cure is effected, or a satisfactory trial of its powers has been made. In no disease, which "flesh is heir to," is it more important to inculcate patience during treatment than epilepsy, and the failures of medical practitioners in contending with it, are to be attributed to the disregard of this admonition, rather than to the incurable nature

of the disease; we might mention also, a want of confidence in remedies, among medical men, as an obstacle in the way of satisfactory trials. In every successful case our remedy should be continued sometime after the convulsions have ceased to return; the patient cannot be considered cured until the general health too is restored, even if the convulsions have long subsided.

It is not pretended that the crust will prove remediate in every case of epilepsy, nor even in all such examples as are idiopathic; some of these may be so strongly engrafted upon the system, from long continuance of the disease, as to have become completely constitutional and fixed, and necessarily irremediable. In the case connected with organic lesions of the skull or brain, (could they possibly be distinguished,) we should never advise the crust; but as it must be confessed that such cases cannot be discriminated, it will be safest in every instance to give the remedy a fair trial, (more especially as it is not likely to aggravate the incurable cases,) and such has uniformly been our custom.

In obstinate cases the crust should be continued for more than a year before it is to be discarded, or the case abandoned as incurable; both forms should always be employed and used alternately.

The crust in form of tincture is also a valuable nervine and anti-spasmodic in hysteric convulsions, and indeed in hysteria generally. In that variety, connected with or proceeding from uterine irregularities incident to sterile married, (or unmarried,) females, it will be particularly serviceable; with such the paroxysms most strikingly resemble epilepsy.—*Jour. of Medical Sciences.*

ART. LXIV. OBSERVATIONS ON THE MEDICAL PROPERTIES OF THE VERATRUM VIRIDE. By CHARLES OSGOOD, M. D. of Providence, Rhode Island.

SOME of the popular names of this plant are American hellebore, swamp hellebore, Indian poke, Indian Uncas, poke weed, bear weed, itch weed, tickle weed. Beside these, there are others of a more local character, and of those already enumerated, there are several which are equally applied to other plants. It is indigenous—found in almost every part of the United States, the product of swamps and wet meadows—top annual, and root perennial. It appears early in the spring, and is one of the first plants which attract our notice at the commencement of returning vegetation. It is often found associated with the *Ictodes fœtidus*, particularly on the margin of small streams in low boggy lands. Both require the same soil, and grow with equal luxuriance. Its flowering season in the northern and middle states is in June; in the southern as early as May. This plant in its botanical characters is closely allied to the *Veratrum album* or white hellebore, a distinguished medicinal plant found in most countries of Europe. Its botanical description is fully given in most of our works upon that subject. The *root*, the part employed in medicine, is bulbous, the upper portion tunicated like an onion, the lower half solid, sending forth a large number of strong, whitish radicles. This root has a strong acrimonious taste, leaving its pungency in the mouth and faucus a considerable time after being masticated. The decoction, though intensely bitter, is less acrimonious than the root in substance. The proper time for collecting this, as well as most other medicinal roots, is in the fall of the year, after the decay of the top. Its medicinal properties are then most active, and appear to be the most permanent. When kept *over* more than one season, its active properties become impaired; it should therefore be gathered every year, and preserved in a dry place.

The early history of this plant is involved in much obscurity. Our accounts of its medicinal use by the aborigines are altogether vague and unsatisfactory. It appears to have been known to them rather as a poison than a medicine. Its use in the election of their chiefs is noticed by Joselin, an early visiter to this country, who calls it "white hellebore." According to this writer, that individual whose stomach was least susceptible to its deleterious effects, was regarded as the "strongest of the party, and entitled to command the rest." It has been long and extensively used for the destruction of vermin and birds. Among many of the farmers of New England, it still continues a common practice to protect their corn fields from the havoc of birds, by scattering the ground with kernels of corn saturated in a strong infusion of the root: this is done just as the corn is springing from the ground, it being then most liable to depredations from the feathered tribe. With many it is customary to subject their seed corn to the same process before planting. A short time after partaking of corn thus prepared, muscular action becomes so much paralyzed as to prevent either flying or walking, and in this torpid state they are readily taken and killed. Unless caught while thus narcotized, many of them recover and fly away.

The analogy in external appearance between this species and the *Veratrum album* of Europe, was the circumstance which first led to an investigation of its medicinal properties. But notwithstanding this analogy in botanical affinities, there is a decided difference in their medicinal operations—the album being hydragogue cathartic; whereas, the viride has not the slightest laxative effect. So far as I am acquainted, this plant has never been the subject of a thorough analysis. It is commonly said to contain the proximate active principle *veratrine* as the seat of its medicinal properties. This opinion, however, seems to be entirely gratuitous, being drawn from its analogy in its external appearance with the European species, rather than from actual investigation. If we consult analogy in medicinal properties, instead of external appearance, our conclusions will be more rationally founded. This is, indeed, the only analogy that can give much weight to an

opinion upon this point; and so far as this goes, is in decided opposition to the hypothesis, that the active principle of this species is the same as of the European—that, as has been before observed, being hydrogogue cathartic, while this possesses no cathartic powers. It has been suggested, that this diversity in medicinal effects might be explained on the supposition that veratrine, though the proximate active principle did not exist in the plant in the form of a bi-gallate, as in the European species—the diversity in medicinal properties warranting the belief that the salt was different, though the base might be the same. This opinion, though at first view plausible, is neither supported by analogy, nor in accordance with the known laws of vegetable chemistry. Although solubility and activity are often affected by a change of acid simply, I have no knowledge that vegetable chemistry furnishes us with any instance of a change in the medicinal properties of the proximate active principles of a plant, by varying the acid with which the proximate principles or base may be combined. Among many instances which may be adduced where this integrity in medicinal effect is preserved in spite of a change of acid, the sulphate and acetate of quinine, sulphate and tartrate of sanguinarine, sulphate and acetate of morphine, are familiar examples. I have been thus particular on this point, as the general impression of identity in active principle with the European species has greatly interfered with the investigation this plant deserves, and would otherwise have received.

Since the above was written, I have endeavoured to test the correctness of my conclusions by chemical analysis. Although my experiments were not sufficiently extensive to accomplish this object, still I would briefly detail the process adopted. The preparation from which I attempted to obtain the proximate active principle was the infusion, prepared by adding boiling water to the finely bruised root, and allowing it to macerate twenty-four hours, the quantity of root being such as to saturate the water. After filtering this infusion, a precipitate of a dull white colour was thrown down by ammonia. This precipitate, after being repeatedly washed, was

boiled for about five minutes in alcohol, with a small quantity of animal charcoal, and filtered while hot. On cooling, a small portion was again thrown down, the alcohol still holding the greater part in solution, which was afterwards obtained by evaporation. This substance, after being thus subjected to the action of alcohol and animal charcoal, was of a clear white colour, pulverulent, inodorous, and very acrid, producing a peculiar stinging sensation when taken upon the tongue. Whether this was the principle in which the medicinal properties of the plant reside, is a point I am unable to determine, being deprived of an opportunity for extending my investigations, by inadvertently losing the greater part of the specimen obtained. Not being aware of its extreme volatility, the filter containing it was placed for the purpose of drying in a temperature which appeared to be but little higher than that of the body, at the extent I should think it could not have exceeded 120° Fahr. At this temperature most of it volatilized, and was lost.

Since the above experiments, I have had no opportunity for repeating the process.* The *medicinal operations* of this plant have been variously estimated. In the United States Dispensatory by Drs. Wood and Bache, it is represented as agreeing in its effects with *Veratrum album*, which seems to be the most common opinion. From the very limited extent to which it has been used as a medicine, but few facts relative to its medicinal properties have come before the profession. Among the causes of this limited use, the common prejudice against the medicinal products of our own country has doubtless had an influence—a prejudice which, in this instance, has the character of inconsistency, so far as prevails the impression of its identity with the Europran species. Our own medicinal articles can never receive a due share of attention, so long as they have to encounter *our own* prepossessions against them, and in favor of those of a transatlantic origin. Pro-

*It is my intention to do this at some future time, and if successful, will forward the result.

fessor TULLY,* of the medical department of Yale College, (whose extensive use of this article well qualifies him to judge of its medicinal properties, and justly to appreciate its value as a remedial agent,) is of the opinion, that as an article of medicine, it ought entirely to supercede, not only the other species of the genus, but also the *Colchicum autumnale.* On many accounts it is certainly far less objectionable. In its general deobstruent effects it appears to be similar to its congener, the *Veratrum album,* as well as to the colchicum. But as possessing fewer of their objectionable features, and being equally efficient as a medicine, it should have the precedence in practice: it is not liable to the same uncertainty in its operation; it does not produce uncontrollable purging in one case in doses which have little or no effect in another; it does not leave the alvine canal in an irritable condition. On the contrary, it operates with as much certainty as any article in the materia medica: is never catharic, and always leaves the bowels in a good condition. It requires but a moderate degree of attention to render the operation of the *Veratrum viride* perfectly safe. It should, therefore, on this account, take the precedence of an article possessing no superiority in medicinal powers, whose operation is not within the control of vigilance and caution.

I am aware there is some diversity of opinion respecting the safety of the colchicum, as well as of the *Veratrum album.* It is occasionally employed for a length of time without manifesting any distressing or dangerous symptoms. But the confidence thus inspired, is too often interrupted by the occurrence of some unfortunate case. I have met with but

*An apology is due Dr. Tully for the liberty I have taken in quoting his authority. Many of the leading principles which form the basis of this article were derived from his public instruction, and while acknowledging myself responsible for its errors, it is but justice to say, that much of whatever merit it may possess, is the result of his discriminating research and extensive observation. Few men in our own country have more assiduously studied the character of our indigenous articles of medicine, or prosecuted this study with greater success. The publication of his lectures on the materia medica would be a boon to the profession, which, it is hoped may, ere long, be realized.

few of my professional brethren who, after an extensive use of this article were not led to consider it unsafe, as occasionally accumulating upon the system, and producing hypercatharsis and prostration, which no medication could relieve.

There is still another reason why the *Veratrum viride* is preferable—being indigenous, it can always be obtained in its recent state, and therefore of uniform activity, while the European species being often collected at improper seasons, and imported in the form of powder, is liable to much variation in strength, and is occasionally inert. Professor Tully, whose authority I have before quoted, thus enumerates the operative effects of this plant. 1st. Deobstruent or alterative. 2d. Acrid narcotic. 3d. Emetic. 4th. Epispastic. 5th. Errhine. In doses as large as the stomach will bear without nausea, its deobstruent operation is manifested by a gradual and general change in the secernent and absorbent system, correcting vitiated secretions, and promoting those which are deficient. As secondary or subordinate parts of its deobstruent operation, it is *resolvent*, producing resolution of inflammations by internal use; *antipsoraic*, having the power of removing certain cutaneous affections; *cholegogue*, producing an increase in the biliary secretion; *expectorant*, promoting the excretion of fluids from the bronchial membrane; *diuretic*, causing a moderate increase in the secretion of urine: *discutient*, possessing the power of dispersing tumours from local application; and finally, *sialogogue*, producing a decided increase in the secretion of the salivary glands, both from topical and internal use. This latter operation is much more prominent in some constitutions than others. It is usually slight, and of little consequence.* It does not appear to be directly *diaphoretic*, though diaphoresis may be produced by virtue of its emetic operation; the secretion of the skin being more of a clammy, adhesive nature than is usually caused by the simple

* Dr. Peabody, of Norwich, Connecticut, informs me, that in one instance, he found the continued internal use of this medicine produce as powerful salivation as often witnessed from the use of mercury. This, however, passed off directly with the discontinuance of the medicine, leaving no unpleasant effects.

emetics. I am inclined to think that it is *emmenagogue*, but have not sufficiently attended to this operation to arrive at any very satisfactory conclusions. Some of my medical friends, who have made considerable use of this article, are of the opinion that it possesses emmenagogue properties. Further observation is still requisite fully to establish its effect upon this secretion. Of the different operative effects of this medicine, its deobstruent or alterative is the most important. To obtain this operation fully, the nearer the strength of the circulating system approaches a healthy standard the better. If there be phlogistic action, it is necessary to precede its use by bleeding or refrigerants; if debility, this should be removed by tonics, and a supporting regimen. Its narcotic effects are very prominent, and when the system is brought fully under its influence, are manifested by faintness, somnolency, dimness of sight, dilation of the pupils, vertigo, head-ache, impaired muscular action, hiccough, cold clammy sweat, small, unfrequent, and compressible pulse. Its influence upon the circulating system is very decided. By the exhibition of full doses, I have frequently known the pulse, when ranging from 75 to 80 in the minute, reduced to 35 or 40 in the course of a few hours. Its effect upon the strength of the pulse is as great as upon its frequency. For counteracting its ultimate narcotic effects when carried to an undue extent, I have invariably succeeded with small doses of laudanum and brandy, often repeated; camphor and ammonia are valuable adjuvants, but far inferior to opium and brandy. It is usually emetic in doses of from four to six grains of the substance; one to two fluid drachms of the tincture, or one to two grains of the extract, requiring a greater length of time to produce vomiting than most other emetics, excepting those of the deobstruent kind. The larger the dose, the more speedily is the vomiting produced. For the mere purposes of an emetic, however, this article can never be advantageously employed, on account of its acrid narcotic effects, excepting perhaps in those cases which may indicate a narcotic operation in conjunction with the emetic. As an epispastic, (used as a generic term, including the various

grades of irritation, vesication, rubefaction, &c.) it is sometimes employed with advantage, though for this operation it is comparatively of minor importance; other articles being equally efficient and more generally at hand. Its errhine powers, (if this be an operation distinct from the latter, and I am inclined to think it is,) are produced either by the fine powder of the root, or the extract. When snuffed into the nose it produces long continued and sometimes violent sternutation. As illustrative both of the medicinal powers of this article, and its activity in the form of extract, I will briefly detail its effects, as produced on myself and another individual, a member of the profession, whose experiments were at my request, and in my presence.*

At 12 o'clock, M. I took two grains of the finely pulverized extract. At 1 began to experience a slight sense of uneasiness at the stomach, but not amounting to nausea. This uneasiness at the stomach, though so slight as to be attended with very little inconvenience, continued till about half past 1, when vomiting commenced. The contents of the stomach were thrown off without nausea, but with a sense of rising in the œsophagus, which perhaps might be compared to the rumination of animals. Judging from my sensations at the time, should suppose the muscular fibres of the stomach contracted gradually and steadily upon its contents, until they were expelled, the diaphragm and abdominal muscles remaining entirely inactive. After the vomiting had continued a considerable length of time, it appeared to be more the effect of spasmodic action, and was attended with chills and coldness of the whole body, but moisture of the skin. At the expiration of about an hour vomiting ceased, and was followed by dimness of sight, dilatation of the pupils, vertigo, faintness and somnolency, pulse at the wrist 40 in the minute, and scarcely perceptible. I then took 25 ♏ laudanum, and fell asleep. After the lapse of an hour, awoke with the continu-

* These experiments with the extract were made immediately after this preparation was formed, and before it had been at all used as a medicine. Its effects were noted down at the time, the substance of which are here given.

ance of the same symptoms, together with a dull pain in the epigastrium, and immediately repeated the laudanum. But finding no relief, the dimness of sight increasing, and on motion of the body, or turning the head, amounting almost to blindness, a sensation of stiffness in the voluntary muscles supervening, particularly the temporal and extensors of the head, together with considerable general prostration, the dose of laudanum was doubled. This produced a partial abatement of the symptoms, and after another similar interval was repeated, with half a gill of brandy, which soon effected entire relief. In connexion with these symptoms, it should be observed that I am unusually susceptible to the operation both of narcotics and emetics.

The individual to whom I have alluded as also taking this extract, may perhaps be considered as at the other extreme in the range of susceptibility. He commenced at 9 o'clock in the evening, with two grains. In ten or fifteen minutes, slight uneasiness at the stomach; at half past 9 took four grains more; at 10, a sensation of something like a ball rising in the œsophagus, which seemed to extend up as far as the top of the sternum, as if propelled by a gradual tonic contraction of the stomach. At quarter past 10, vomiting commenced. This was attended with very little inconvenience at first, but after continuing a short time became more severe, the ejections consisting principally of bile; together with the vomiting, there was much ineffectual retching; almost constant hiccough; chilliness; dimness of sight; vertigo; inability to control the voluntary muscles; distress at the stomach; pulse small and creeping, and 34 in a minute; the ordinary frequency ranging from 56 to 58. As these symptoms were becoming more aggravated, he took ʒss. of laudanum, and went to bed scarcely able to walk. In ten or fifteen minutes the laudanum was repeated, which soon produced sleep. In the morning was apparently in better health than he had been for several months. At 7 the same morning, three grains more were taken; at 9 complained of a confused sensation in the head, and almost an entire loss of power of the gastrocnemii muscles. At 12 M. three grains more were taken,

and at half past 12, all the muscles of the forearm were affected in the same manner. At 1 vomiting; pulse 40, and other symptoms essentially the same as the day before, excepting a less degree of chilliness. At half past 2, took 45 ♏ laudanum, and in the course of two hours the effects of the medicine entirely subsided, excepting the inability of using the gastrocnemii muscles. At 11 in the evening two grains more were taken, which, in about three quarters of an hour, produced vomiting like the other cases, but without any appreciable narcotic effect.

The freedom with which the extract was taken by this individual, was not in conformity with my request, as I had previously tested the effects of two grains upon myself. My wishes, however, were overruled in the confidence he had in his own powers of withstanding the effects of narcotic agents. He afterwards made experiments with this article in smaller doses, and at regular intervals. Doses of half a grain once in three hours, after being repeated three or four times, were followed by an uneasiness at the stomach, with the same paralyzed condition of the extensors of the feet. The dose was then diminished to a quarter of a grain, and continued three days at the same intervals. With these doses, muscular action was not so constantly interrupted, this effect occurring only after considerable exercise, as walking or jumping. By continuing this article three or four days in doses of one-eighth of a grain, once in three hours, it was followed by moderate diuresis. The same effect was also noticed in two other individuals, who experimented with it at the same time. This operation, however, does not appear sufficiently prominent for the treatment of hydropic diseases. In no single instance in the experiments with this article upon myself and others, did it operate in the least as a cathartic; nor in my practice since, have I ever discovered in it any disposition to pass off by the bowels. Dr. John Ware, of Boston, who experimented with it in the form of powder of the root, states that he administered it in thirty cases, and "in no instance was it very clear that purging was produced."*

* Vide Dr. Bigelow's American Medical Botany, Vol. II. Part 2d.

The pharmaceutic preparations of this plant are tincture, wine, extract, ointment, infusion, decoction and powder of the root. Of these, the tincture, wine, extract and ointment, are the most eligible forms, and for common medicinal purposes, appear to be all that are requisite.

The tincture is prepared by adding the recent bruised root, ℥vj. to diluted alcohol, Oj. I was formerly in the habit of using ℥viij. to the pint, but this appears to be more than is necessary for saturation: medium dose from f. 3ss. to f. ʒj. For the wine, recent bruised root, ℥vj.; white wine, ℥xiv.: officinal alcohol, ℥ij. The alcohol is necessary to prevent the preparation from becoming sour in warm weather; dose the same as of the tincture. In reference to the relative value of these two preparations, I do not know that any thing can be said in favour of the wine, which would not with equal truth apply to the tincture. In medicinal efficacy, there appears to be no appreciable difference. The extract is made simply by expressing the juice of the recent root, and inspissating in the sun. Thus prepared, it is hard and dry, of a grayish colour, and capable of being reduced to an impalpable powder. It requires a considerable quantity of the root to produce much of the extract. To obtain the juice it must be strongly bruised and subjected to strong pressure.

I was first induced to make this preparation for the purpose of having a form which would embody the greatest activity in the least bulk, and which would retain this activity a longer time than the crude root. In these particulars my expectations have been fully realized. Its activity is sufficiently attested in the experiments already detailed. Medium dose from one-fourth to one-half grain. I have rarely been able to exceed one-half of a grain, when repeated at intervals of three or four hours, without producing more or less narcosis and disturbance of the stomach. For what length of time this extract when excluded from the air will fully retain its medicinal activity I am unable to say; I now have in my possession a part of the first parcel which I prepared, and although about three years old, does not appear to have lost any of its strength. It has been kept excluded from the air, though not

from the light. I am inclined to think this extract will, to a considerable extent, supersede the other preparations. Its activity in this form, and the facility with which it may be administered, certainly favour this supposition. The extract by decoction is an inferior article, possessing but little medicinal power. Heat appears to injure it very materially. The ointment is the only preparation which has been made officinal in the Pharmacopœia of the United States. The following are its directions: "Take American hellebore in powder, ℥ij.; oil of lemons, 20 ♏; lard, ℥viij. and mix them." For this purpose I have found the pulverized extract far preferable to the powder of the root. The following is the formula I have usually adopted: ℞. Extract in fine powder, ʒj.; oil of lemons, 3 ♏; simple cerate, ℥j.; to be thoroughly incorporated without heat. Cerate is preferable to lard, as the latter is melted by the warmth of the body. The greater activity and fineness of the powder of the extract make it more eligible than the powder of the root.

It is unnecessary fully to enter upon a therapeutic application of this article, or to enumerate all the diseases in which it has been employed. Among those, in which it stands foremost in our list of remedial agents, are the arthritic inflammations. In this class of diseases, it should be given in such doses as at first fall short of producing disturbance of the stomach, as one-third of a grain of the extract, or 3ss. of the tincture, regularly repeated every three or four hours, and gradually increasing to the extent of producing narcosis or vomiting on the one hand, or resolution of the disease on the other. To ensure it best effects, opium in moderate quantities should be conjoined. A combination of the wine, with the tincture of opium, in the proportion of three parts of the former to one of the latter, cannot it is said be distinguished in its operation from the celebrated *Eau medicinale*, excepting by the catharsis which sometimes ensues from the use of the latter. This combination is much more efficient than the wine or tincture alone, producing less disturbance of the stomach, and can be employed in larger quantities without inconvenience from its narcotic effects. In *gout*, of the regular

kind, this article manifests its best powers. It is the opinion of Dr. Tully, that with proper management it will cure a majority of cases. It proves most successful in those constitutions which are not impaired by habits of gluttony and intemperance, at the same time it is much better adapted to broken down constitutions, than the colchicum or *Veratrum album*, on account of the exhaustions these articles are liable to produce. If used in efficient doses, and perseveringly continued several days, there are few cases but will be decidedly benefitted, if not radically cured. It appears to be as well adapted to rheumatism as gout. In the treatment of that disease, both in its acute and chronic form, the article is well worthy the attention of the profession. There is no remedy in the materia medica within my knowledge, with the exception perhaps of the *Actæa racemosa*, to which *acute rheumatism* more easily yields. In this disease it should also be combined with opium, for the purpose of relieving pain, and qualifying its effect upon the stomach. The amount of opium conjoined should be graduated in some measure by the severity of the pain. Thus qualified, it should be administered at regular and short intervals, generally as often as every three hours, in such doses as at first fall short of producing nausea, and gradually increased. Thus administered, the system is kept under its steady and uniform influence. If the doses fall short of producing its specific effects upon the stomach and brain, or if administered so irregularly that the effects of one dose pass off before another is given, but little will be accomplished. In a common case of acute rheumatism, a cathartic of calomel should first be premised, unless the bowels are in a relaxed condition, or some other circumstance exists to contravene this practice. If the stomach is not in an irritable state, it is then best to commence with f. ʒj. of the tincture, in the combination recommended in gout, each dose to be increased 5 or 10 ♏, as the case may require, till some effect is produced. All local applications should be avoided, as in no way promoting the operation of internal means, and only liable to draw the disease from one part to another, where perhaps its presence is still more to be dreaded. The more acute the disease,

the more erratic in its character, and the earlier in its progress, the more speedily does it yield to this course of medication. In *chronic rheumatism*, unattended with inflammation and swelling of the joints, it is less successful than in the acute, from its being a less controllable form of the disease. In this variety, however, it is probably more efficient than any other remedy of equal safety which we possess. It is often necessary to continue its use several days before much benefit is perceived. It is not very material whether it is exhibited in the form of tincture or extract. In acute rheumatism, where greater promptness is requisite, and small variations of dose often desirable, the tincture is most eligible; but in the chronic variety I have generally used the extract for the purpose of exhibiting in the form of pill, which in medium doses is not so liable to produce disturbance of the stomach. The following formula for a common rheumatic pill appears to be well adapted to a majority of cases. R. Ext. ver. vir. grs. x.; opii. grs. v.; sapon. venet. grs. xv.; muc. gum. Arabic, q. s. M. To be divided into thirty pills. Dose, one pill to be repeated every three or four hours, as the urgency of the symptoms may require. After two or three repetitions, there is usually some disturbance of the stomach, and occasionally slight narcosis. In metastasis of rheumatism to internal organs, this remedy is equally valuable. In cases of transfer to the brain, from external applications or other causes, it has been found highly beneficial, not only from its resolvant powers in arthritic inflammation, but from its narcotic properties in reducing the frequency and strength of the pulse. In a case of this kind which came within my observation about two years since, the pulse in a few hours was reduced in frequency from ninety-five to forty in a minute, with manifest relief of the existing delirium. I think it will also be found a valuable remedy in arthritic inflammation of the heart. So far as my knowledge of its use in this affection extends the result has been favourable.

Pneumonia, with the exception of low typhoid cases, is a disease in which it has been advantageously employed. It appears to be best adapted to the variety *notha*, and has often

succeeded in breaking up the disease when acute and fully formed. I have also used it in the variety *vera* with decided benefit. Most cases require a small quantity of opium in combination, and when administered with the view of breaking up the disease, it should be given in full doses, and repeated at short intervals. It is also one of our most valuable remedies for arresting the cough, which is sometimes a protracted sequel of this disease, and in consequence of the irritable condition in which severe cases are liable to leave the lungs. Protracted cases of *common and epidemic catarrh*, where other means have failed, not unfrequently yield to this article. I have occasionally combined the tincture of *Sanguinaria Canadensis* with increased effect. These two remedies, with the camphorated tincture of opium in equal parts form a valuable compound, and may be given in doses of 50 or 60 ♏ repeated at intervals of four or five hours. When the disease from neglect or other cause assumes the form of membranous phthisis, much less is to be expected from its use. In cases of this kind the *Actæa racemosa* is a valuable adjuvant, and should enter largely into the combination. It has been successfully employed in simple *idiopathic cough*, and seems to be well adapted to the kind, or irritation on which this cough depends. I have often used it in this affection with entire relief, in doses short of the nauseating point, repeated four or five times in the twenty-four hours. In many cases much is gained by a judicious combination with other deobstruent narcotics, as Actæa, Sanguinaria, Digitalis. In such combinations, there is usually less disturbance of the stomach, and less inconvenience from ultimate narcosis.

There is much testimony in favour of this article in the disease commonly called *asthma*, (Dyspnœa exacerbans of Good.) Dr. Tully thinks it a valuable remedy, and one which will often break up the disease. It should be given in the drachm doses of the tincture, as the paroxysms are coming on and continued at short intervals. The paroxysms is generally relieved by the first dose, which should be conjoined with ʒss. of the tincture of opium. In *dysentery* it is also recommended by Dr. Tully. The non-malignant cases of this dis-

ease are those in which it is more particularly indicated. In cases of this kind, Dr. T. thinks its operation is analogous to that of mercury in removing the specific inflammation of the mucous membrane of the bowels, on which the existence of the disease depends.

Dyspepsia in some of its forms is relieved by this remedy. It is principally valuable by virtue of its chologogue powers, and is consequently best adapted to those cases attended with a deficient or vitiated secretion of bile. Its effect upon the mind in cases of depression of spirits, so frequently a symptom of the disease, is sometimes very prominent. I have often observed this effect after the system has been for a time under its influence, and the narcosis allowed to subside.

The full extent of its *discutient* powers are yet to be learned by further experience. In several cases of syphilitic enlargement of the inguinal glands, in which the common mercurial ointment produced but a partial reduction of the swelling, I have speedily succeeded in completing the cure with this remedy. The cerate prepared as before directed, is best adapted to this purpose. As an *antipsoraic*, it has been used in many cutaneous affections, with much authority in its favour. Of its value in this class of diseases I can say nothing from my own experience. Salt rheum, (var. of ecpyesis impetigo of Good,) scalled head, (E. porrigo,) itch, (E. scabies,) are the forms of cutaneous diseases in which it has been more particularly recommended.—[*Am. Jour. Med. Sciences.*

ART. XLV. CHEMICAL EXAMINATION OF DIGITALIS AND HYOSCYAMUS. By M. M. Brault and Poggiale.

About six months since we were occupied with the analysis of the Digitalis, and especially of digitaline. These researches not possessing, in our opinion, sufficient interest or novelty to require notice, we did not publish them. But specimens of *digitaline* having been lately sent to the Royal Academy of Medicine, which proved to be nitrate of potash and sulphate of lime, we shall now make known the result of our labours.

In making these researches, our intention was to study, analyze and endeavour to classify this substance. We had no doubt of its existence, as we could not suppose that so many persons could be deceived. We therefore several times repeated the processes employed to prepare this pretended alkaloid, but never were able to detect it.

At one time we supposed that we had succeeded, because we obtained beautiful white crystals, but these proved, on analysis, to be sulphate of lime.

The process of M. Pauquy consists in boiling the leaves of the digitalis in distilled water which has been rendered sour by the addition of sulphuric acid, treating the decoction with calcined magnesia, and the dried precipitate with alcohol. This, when distilled, afforded a white substance in fine acicular crystals. Without fear of contradiction, we assert that this process will never afford the desired results. It is of importance that others should repeat it, and we trust such will be the case, that a process so defective should no longer be quoted and referred to.

We have also tried the method proposed by M. Leroyer, which is too long for insertion, and have always obtained, with that chemist, a brown pitch-like substance, possessing an excessively acrid bitter taste. This is the active principle of the digitalis or the digitaline of M. Leroyer. We have examined this brown substance with great care, as we hoped to extract a crystalline principle from it, and became con-

vinced that it is nothing more than an extract composed of a great proportion of chlorophylline, much resin, a fatty matter, and different salts of lime and potash. We arrived at these results as follows: The extract was dissolved in water sharpened with sulphuric acid, this precipitated a great part of the chlorophylline. On filtration the liquid assumed a yellow colour. It was evaporated to a syrupy consistence, cold water added and the whole filtered. This operation was repeated until the whole of the chlorophylline was separated, the fluid then became of a pale yellow colour. This liquid was again evaporated, and permitted to cool, when a brown substance was obtained, having all the properties of the resins. This resin, which was deposited at the bottom of the vessel, contained a fatty matter which was removed by means of ether. On the surface of the fluid was a beautifully crystallized substance, which proved to be sulphate of lime, after all this had been removed by several crystallizations, a small quantity of sulphate of potash remained in solution.

M. Leroyer states that M. Prevost had seen crystals of digitaline with a magnifying glass. Nothing, however, proves that these were really crystals of digitaline; on the contrary, we are convinced that they were nothing more than salts of lime and potash. A microscopic examination is not enough; the substance itself must be studied; if this had been done by M. Leroyer, he would have seen that this body was not a vegetable but a mineral substance.

The properties ascribed by M. Leroyer to his digitaline, are additional proof of our assertions; he says it attracts moisture from the air. When we reflect that it contains salts of potash and hydro-chlorate of lime, this property is not astonishing.

We need scarcely add that the digitaline of M. Planiava is only an extract composed of nearly the same principles as that of M. Leroyer.

It results from the above, that digitaline has not yet been obtained. That of M. Leroyer is a compound of chlorophylline, resin, a fatty matter, and some salts of lime and potash. That the method of M. Pauquy furnishes no product.

From our experiments it would appear that the leaves of digitalis are composed of—

1. Chlorophylline. 2. Resin. 3. Fatty matter. 4. Starch. 5. Vegetable fibre. 6. Gum. 7. Tannin. 8. Salts of lime and potash. 9. Volatile oil. 10. A fatty oil. 11. Oxalate of potash.

We are of opinion that we are rendering a real service to science in publishing these reflections. If we have not discovered the active principle of digitalis, we have at least corrected an error. Why, in fact, seek for a base in digitalis which in all probability exists in theory only? Is its presence required to explain the properties of this plant? We think not. Without affirming that digitaline does not exist, we believe that the purgative and diuretic properties of digitalis are owing to a union of all the substances composing it, and especially to the resin. This resin, in fact, is bitter, acrid, and almost corrosive. If a very small portion be applied to the tongue, a very painful sensation of heat and constriction of the throat is felt. Two grains cause a great irritation of the stomach. It is very soluble in hot alcohol, soluble in ether and the volatile oils, insoluble in water alone, but taken up by water sharpened with an acid. What perhaps proves still more that digitalis owes its properties to this resin, is, that the alcoholic tincture possesses the same action. It is also well known that the fecula deposited by the expressed juice has been much used in medicine, because the resin combined with it communicates active properties to it.

Hyoscyamus.—If the observations of several distinguished chemists did not lend support to our investigations, we should not dare to assert that hyoscyamine is no better known than digitaline, and that it has never been isolated. M. Chevalier, who has several times attempted to separate it, has never succeeded, and certainly no one will contest the skill of this chemist.

In commencing this investigation, we had not the wish to prove that hyoscyamine does not exist, on the contrary we were desirous of discovering and studying it. Although we have not obtained it, we are of opinion that we ought to publish

our researches. It may perhaps induce a severe scrutiny as to their truth, which cannot fail of eliciting truth.

According to M. Brandes, hyoscyamine is obtained by precipitating decoctions of the plant by an alkali, drying and treating the precipitate with alcohol. By evaporating this alcohol, prismatic crystals are obtained, susceptible of combining with nitric and sulphuric acids, and forming salts.

We have repeated this procedure four times with the greatest care, and have always obtained a white powder which attracted moisture from the air. This powder was composed of acetates, phosphates, sulphates and hychochlorates of potash, lime and magnesia. Before treating this powder with the reagents which established the presence of these salts, we subjected it to the action of concentrated sulphuric acid at a high temperature, and were convinced that it was of a mineral nature. This operation was performed with both the seeds and the leaves of the hyoscyamus, with the same results.

If instead of limiting themselves to giving the physical characters of a new substance, chemists would analyze and carefully study it, these errors would not be committed. In 1824, M. Payen made a detailed report to the Society of Pharmacy on a memoir by M. Runge, on the modes of discovering the slightest traces of the active principles of belladonna, hyoscyamus and datura, in cases of poisoning with these substances. We shall notice only the method which this latter chemist has proposed for isolating the active principle of hyoscyamus.

This is as follows: an alcoholic tincture is prepared with the roots or dried leaves or the watery extract of hyoscyamus; this is evaporated to dryness, and the residuum dissolved in water. The resin is precipitated, and the hyoscyamine remains in the water in combination with an acid. This solution is treated with acetate of lead and hydro-sulphuric acid, and the acetate of hyoscyamine decomposed by ammonia. On evaporation a white powder is obtained, which is very slightly soluble in water and oil, more so in alcohol. According to M. Runge this principle neutralizes acids, and forms crystallizable salts.

M. Payen could not have repeated this process, or like us, he would have found that this white powder is formed of the sulphates of potash and magnesia, carbonates of potash and lime, phosphates and acetates.

Hyoscyamus also contains much fatty oil, a peculiar resin, woody fibre and gum.

We conclude from the above that hyoscyamine has not as yet been isolated, and that the white substance which has been mistaken for it is a mixture of various mineral salts. The acro-narcotic properties of hyoscyamus are probably owing to a union of all the principles composing it.—*Journ. de Pharm.*

ART. XLVI. MODES OF DETECTING THE EXISTENCE OF SULPHUROUS ACID IN THE HYDROCHLORIC ACID OF COMMERCE. By J. GIRARDIN, Professor of Chemistry at Rouen.

THE hydrochloric acid of commerce is far from being pure. It is always of a yellow colour from an admixture of the perchloride of iron, which results from the action of the hydrochloric acid gas on the cylinders in which it is made. It also often contains chlorine and hyponitric acid which likewise tend to colour it. It generally contains variable proportions of sulphuric acid, or small quantities of sulphate of soda and lime. Finally, it is frequently adulterated with sulphurous acid.

Of all the foreign matters spoken of above, the last is by far the most injurious, and more especially where the hydrochloric acid is used for the manufacture of chlorine, the chlorites, and the hydrochlorate of tin; and hence it is extremely important to be able to recognise with ease and certainty the least traces of this adulteration.

The methods hitherto devised do not fulfil these indications. That cited by M. M. Bussy and Boutron Charlard, in their "*Traité des moyens de reconnaitre les falsifications des drogues*

simples et composés, (page 17) consists in saturating the hydrochloric acid with barytes water, after having diluted it with three or four times its weight of distilled water. A white precipitate of sulphite and sulphate of barytes is formed, which washed several times to separate the chloride of barium, and then sprinkled with concentrated sulphuric acid, exhales the odour of sulphurous acid. Independently of the time and the manipulations required by this plan, which are of themselves sufficient to prevent its use, it has another serious defect; which is that it requires a great sensibility of the organ of smell, which is seldom found among manufacturing chemists.

Another mode has been proposed by M. Chevreul, in his Leçons de chimie appliquée *à* la teinture (xi. Leçon, page 15.) This learned chemist has ascertained that by adding a solution of sulphite of potash to a salt of the deutoxide of copper, a yellow precipitate is formed, consisting of the double sulphite of potash, and protoxide of copper; and that if this precipitate be heated with water it is decomposed into sulphite of potash which dissolves, and sulphite of the protoxide of copper, which is insoluble, and of a red colour. From this fact, M. Chevreul concluded, that when a hydrochloric acid contained a notable quantity of sulphurous acid, that it might be verified, by saturating the former with potash, and adding a solution of sulphate of copper, thus producing a yellow precipitate, which would become red by ebullition. But these theoretical views are not confirmed in practice. In fact, the plan of M. Chevreul, though well calculated to distinguish sulphurous acid when free or combined with bases, does not answer when this acid is mixed with the hydrochloric. We have often applied this process to hydrochloric acids *surcharged* with sulphurous acid, and have never obtained the reaction indicated by M. Chevreul. The addition of the sulphate, or any other salt of copper to these acids, neutralised by potash, does not occasion any precipitate, and when they are concentrated, it only produces a light bluish deposit which does not change on ebullition.

Gay Lussac was the first to recommend (*in* 1813, *Ann. de*

Chim. t. 85, *p.* 206) the red sulphate of manganese, as the best reagent that that can be employed, to recognise if a body is capable of oxidizing. This salt, which some regard as a sulphate of the sesquioxide of manganese; others as a sulphate of the bioxide, and some as a sulphate of the bioxide mixed with hypermanganesic acid, is obtained, by digesting peroxide of manganese, reduced to an impalpable powder, in concentrated sulphuric acid for a few days; a beautiful red, and very acid liquid results, which is the salt in question. All the combustible bodies greedy of oxygen, organic substances, the slightly oxygenated acids, as the sulphurous, phosphorous, &c., cause a loss of its beautiful colour, by reducing it to the state of a salt of the peroxide. It may therefore be employed to ascertain the presence of sulphurous acid in the hydrochloric acid of commerce, as a few drops of this red liquor, on being added to the latter acid will speedily become colourless, if any traces of the former be present. But the use of this reagent in this case is not attended with all the advantages that might have been supposed. First, this salt, like all the red salts of manganese is not stable; it loses its colour by long exposure to the air, and is immediately changed on the addition of water; but above all it is as readily acted upon by nitrous as by sulphurous acid, and hence it happens that a hydrochloric acid containing the former, which is often the case, will act on this reagent as if it contained the latter, thus giving rise to mistakes.

Being constantly consulted by manufacturers of Rouen on the purity of hydrochloric acids, and consuming a large quantity myself, in the manufacture of artificial mineral waters, I endeavoured to discover a simple, prompt and infallible method of discovering the least traces of sulphurous acid in these acids. The following appears to unite all these conditions, and has never failed.

It is formed on the action of the protrochloride of tin on sulphurous acid. Pelletier, Senr. long since taught us (*Ann. de Chim.* 12, *p.* 231.—1792) that when placed in contact with this latter, it becomes deoxigenated, and gives rise to a precipitate of a beautiful yellow colour, consisting of sulphur and peroxide of tin.

The mode of operating is as follows:

About half an ounce of the hydrochloric acid to be tested, is to be poured into a glass, and two or three drachms of white and unaltered salt of tin added to it, the mixture is to be stirred with a glass tube, and two or three times as much distilled water added.

When the hydrochloric acid contains no sulphurous acid, no remarkable phenomenon takes place on the addition of the hydrochloride of tin or the water; the first dissolves, and the solution only becomes turbid after standing some time, owing to the action of the air on the salt.

But if it contains sulphurous acid, immediately after the addition of the salt of tin, the acid will become turbid, yellow, and when the water is added, an odour of sulphuretted hydrogen is perceptible, and the liquor assumes a brown colour in depositing a powder of the same colour. These phenomena are so apparent, that there can be no hesitation in deciding on the presence or absence of sulphurous acid.

Sometimes the brown colour is not developed for some minutes, and it is dark in proportion as the quantity of sulphurous acid is greater. The disengagement of sulphuretted hydrogen takes place only on the addition of the water. By leaving the coloured liquid to stand, it deposites a powder of a yellow brown colour, this is a mixture of sulphuret of tin, and peroxide of the same metal.

This curious reaction is readily explainable. A portion of the salt of tin is transformed into perchloride at the expense of another portion, whilst the tin thus set free reacts on the sulphurous acid, so as to produce both the peroxide and protosulphuret. As to the small quantity of sulphuretted hydrogen which escapes on the addition of the water, it arises from the decomposition of a little of the sulphuret formed in the hydrochloric acid.

It is essential to obtain these phenomena, that the salt of tin should be added to the hydrochloric acid before the water, for if the acid be first diluted, the addition of the salt will induce no change of colour.

This method is recommended from its simplicity and easy

execution, as a minute is sufficient to determine the purity of a hydrochloric acid, without trouble and without expense. It is so delicate, that a hundreth of sulphurous acid will not escape detection.

I have learnt that many manufacturers who obtain hydrochloric acid charged with sulphurous acid, get rid of it by passing a certain quantity of chlorine through it, which transforms the sulphurous into sulphuric acid; this is one reason why certain of the hydrochloric acids of commerce contain so much sulphuric acid.—*Journ. de Pharm.*

ART. XLVII. ACTION OF TANNIN ON ORGANIC SALIFIABLE BASES, &c. By O. Henry.

Among the characteristic properties of the alkaloids, or vegetable alkalies, there is one peculiar to the whole of them—their precipitation by an infusion of galls. This character, which was noticed by M. Dublanc, Jr., as a test for morphine, is applicable to many of the other alkaloids in a far more striking degree. Is this effect attributable to the tannin or to the gallic acid? This does not appear to have been fully explained, and it was therefore with the hope of throwing some light on the subject, that I undertook the following experiments.

M. Pelouze, in his interesting memoir on tannin, has shown that this body forms almost insoluble precipitates with quinine, cinchonine, morphine, iodine, narcotine, strychnine, and brucine. At the time of the appearance of his memoir, I was endeavouring to discover an exact and yet expeditious mode of determining the quantities of quinine and cinchonine contained in the Peruvian barks of commerce. Pure tannin, it

appeared to me, would answer this end, and form a good *alcaloimeter*.

Some months since I laid the details of this plan before the Society of Pharmacy, (see Journal of Pharmacy, 1834,) and which I will briefly recapitulate: it is founded on the almost total insolubility of the compounds of tannin and cinchonine or quinine in cold water, and consists in adding, by means of the graduated test glass of Descroizilles, a solution of known strength of perfectly pure tannin, to a neutral solution of the cinchona alkaloids, perfectly free from the red colouring matter, as well as from magnesia and lime. The number of degrees required to produce complete precipitation, enables the operator to judge of the quantity of these organic bases, for it has been shown that 100 grammes of quinine or cinchonine, are perfectly precipitated by 250, 63 or 268 grammes 18c. of pure tannin.

To return to the subject under consideration. I had remarked that the tannin, in precipitating the vegetable alkalies, produced very large, white, caseous compounds, and for the most part almost insoluble in cold water; I had, moreover, observed, when potash, soda, lime or ammonia are employed to isolate them, that they become diminished or altered in a marked manner. Tannin, on the contrary, produced abundant precipitates from solutions on which the above substances had no effect.

When to an aqueous solution of pure tannin, or of extract of nut galls, or of any other liquid containing tannin, a somewhat acidulated solution of an organic alkali is added, there will be an immediate formation of a white, flocculent precipitate. This phenomenon takes place with the alkaloids in a more or less marked degree.

If the solution of tannin be replaced by one of pure gallic acid, previously left in contact with gelatine for twelve hours, no distinct precipitation takes place.

The following table shows the effects produced by solutions of pure tannin and gallic acid on the vegetable alkalies.

Veget. alkalies.	*Pure tannin.*	*Effect.*	*Gallic acid.*
Quinine,	White precipitate.	.002	No precipitate.
Cinchonine,	do.	.002	do.
Morphine,	do.	.09	do.
Codeine,	do.	.09	do.
Narcotine,	do.	.002	do.
Strychnine,	do.	.002	do.
Brucine,	do.	.002	do.
Ematine,	do.		do.
Veratrine,	do.		do.
Delphine,	do.		do.
Atropine,	do.		do.
Aconitine,	do.		do.
Coneine,	do.		do.

Observations.—Ammonia gave no distinct precipitate in a solution containing .002 of some of the alkaloids, and .09 of others, whilst the effect of the tannin was very sensible.

The action of tannin on the organic salifiable bases is analogous to that exercised by it on the metallic oxides, that is, it combines with them and produces true salts.

These saline compounds may be analyzed either by means of gelatine, or by double decomposition with the salts of lead, tin, antimony, peroxide of iron, or which is better, by barytes, lime or magnesia. With either of these, the tannin is set at liberty and combines with the animal matter or the metallic oxides, whilst the freed alkaloid either remains in an isolated state, or unites with the acid of the decomposed metallic salt. At the same time I must admit, that the decomposition is rarely easy by the gelatine or the inorganic salts. It was only by means of barytes or lime that I was always able to effect a ready and prompt decomposition of the vegetable tannates. By using these in the state of hydrates and of a soft or gelatinous consistence, and mixing them with one of the alkaline oxides spoken of above, a blueish green colour is produced, which gradually passes to a reddish brown; if the mixture be dried at 100° C. till it becomes pulverulent, and the powder treated with boiling alcohol, this fluid will dissolve

the vegetable alkali, but has no action on the calcareous tannate. It will be found that the tannin had produced no modification in the alkali during its combination with it, and if care be taken, very little of it is lost during these successive manipulations. In operating in the above manner on diluted solutions, acidulated by one or two drops of sulphuric acid, of quinine, cinchonine, morphine, codeine, &c., I was always able to obtain them again in their original quantities, and without any change in their properties; hence, it is probable that all the other vegetable bases are capable of combining with tannin without undergoing any modification.

I have said that when a solution of a vegetable organic salt is treated by tannic acid, an abundant white precipitate is produced, scarcely soluble in water, this precipitate must be considered as an acid or bitannate. I prepared in turn this salt of the thirteen alkaloids as noticed in the preceding table, but as they closely resemble each other in their prominent characters, I will not describe them in detail, but will merely indicate their general properties.

General characters of the organic bitannates.—All the organic bitannates are white, and caseiform, when in the state of hydrates, scarcely soluble in water, but somewhat so when heat is used; they then form a styptic liquid, which on cooling becomes turbid and affords a brown substance resembling resin. When dried in the air, they are reduced to a white powder, which has a musty smell; on exposure to heat, they melt into a brown resinous mass, which is flexible whilst hot, but brittle and friable when cold.

These compounds are soluble in some of the diluted acids, and in boiling alcohol at 32° or even 28°; this latter solution reddens litmus paper; its taste is rather styptic than bitter; none of them appear capable of crystallization.

When exposed in a bell glass containing two-thirds of oxygen, in a mercurial trough, for some weeks, the most part of them become very soluble in water, and strike a blue colour with the persalts of iron. This modification, which takes place without much diminution of the gas, appears to depend on the formation of gallates, and is analogous to that which

occurs when pure tannin is placed in the same circumstances. This experiment was made with the bitannates of quinine and cinchonine.

By means of the metallic oxides, as those of the peroxide of iron, tin, lead, antimony, barium, calcium, and magnesium, these bitannites are decomposed with more or less ease. The alkaloid is set at liberty, and it can be taken up by alcohol, which does not act on the metallic tannate.

Potash, soda and ammonia decompose them in the same way, but the organic bitannate is always soluble in an excess of these alkalies. I obtained by means of heat, a needle like precipitate from the bitannate of morphine, by cautiously adding ammonia; this on examination proved to be pure morphine.

The mode of preparation of these compounds, and their decided action on litmus, show that they are acid salts—true bitannates formed by the union of one atom of the base to two atoms of the tannic acid.

The quantity of pure tannin which unites with a known weight of the organic alkali, is exactly that pointed out by calculation based on their theoretic composition; thus I obtained as follows, with one gramme each of:

Quinine,	Pure and dried at 120° C.	Bitannates melted at 120° C.	3,47 grammes.
Cinchonine,			3,50
Strychnine,			2,69
Brucine,			2,42

Afterwards taking those organic bases, whose elementary analysis is best settled, as quinine, cinchonine, and morphine, and subjecting them in the form of perfectly pure and dry tannates, to decomposition with deutoxide of copper, &c., I found the same relations between the carbon and nitrogen, thus obtained.

Bitannate of Quinine,	Pure and dry, afforded to one of nitrogen.	23,6 carbon.
Cinchonine,		23,7
Morphine,		30,1.

Hence the composition of these salts is:

Organic Bitannates.	*Atoms.*		*Tannin.*	*Alkaloid.*
Bitan. Quinine,	1 at Quin.	2,145	71,48	28,52
	2 " tannin.	5,376		
" Cinchonine,		2,005	72,84	27,16
		5,376		
" Morphine,		3,613	59,81	40,19
		5,376		
" Codeine,		3,296	62,—	38,
		5,376		
" Strychnine,		3,034	63,93	36,07
		5,376		
" Brucine,		3,485	60,45	39,55
		5,376		

This combination of the vegetable bases probably often occurs in nature, at least as regards part of the alcaloid; in the Peruvian barks for example, an analogous compound of quinine and cinchonine with the red colouring matter (a kind of tannin) constitutes the abundant deposit which takes place on the cooling of hot decoctions of bark. This may be regarded as a species of bitannate.

The organic salts of tannic acid and the vegetable bases may be obtained by carefully adding a solution of pure tannin, or infusion of nut galls, to one of the alkaloid. The precipitate, being collected and drained, when dried in the open air, is *a white, pulverulent, hydrated bitannate*, if exposed to 100° C. it assumes a resinous appearance and is anhydrous.

Method of Extracting the Alkaloids by means of Tannin.— The vegetable bases exist in nature, principally in a state of combination with different acids, and form salts which are more or less soluble in water: sometimes this solubility is only sensible on the addition of another acid; and it is on a plan analogous to that I have described for the preparation of sulphate of quinine, that all the vegetable alkalies may be extracted.

It is well known that these bodies being for the most part almost insoluble in water, are precipitated from their acid solutions by the addition of a slight excess of a mineral alkali, as potash, soda, lime, magnesia, or ammonia, when the alka-

loid can be separated from this precipitate by means of alcohol; but it often happens that this alkaloid is in very minute quantities, and moreover is slightly soluble in water, or becomes so under the influence of the precipitating agent: finally, as it is necessary to concentrate the solution to obtain the desired product, there may also be a loss from the reactions, caused by heat, or the formation of mucilaginous matters, which render the solution so viscid, as to greatly retard the complete separation of the precipitates. These obstacles are constantly met with, and are the frequent cause of want of success in these operations. The property of tannin of producing salts with vegetable alkalies, almost insoluble in cold water, may remedy these inconveniences, by permitting all the alkaloid to be concentrated in the precipitate.

Method.—The powdered vegetable, (roots, leaves or fruit,) its extract, or what I prefer, the juice of the fresh plant, is to be treated with warm water, slightly acidulated by means of sulphuric acid. The clear liquid obtained after expression is to be permitted to *cool*, and then *almost* neutralized by potash, soda or ammonia; and, finally, a concentrated infusion of nut galls, or of oak bark added as long as any precipitate takes place. The precipitate is to be collected on a linen cloth, washed with cold water, drained and pressed till it becomes of a pasty consistence. In this state the precipitate is to be mixed as exactly as possible with a slight excess of pulverized slacked lime. A green or bluish colour is produced, which soon changes to a reddish brown, then the magma is to be dried on a water bath, till it becomes pulverulent. In this state it is to be treated with hot alcohol, or sulphuric ether, which have no action on the calcareous tannate, and after distillation of the filtered liquor, a product is obtained containing the alkaloid. By exposing this to the air, it generally crystallizes in a few days, but it is often advantageous to saturate it as exactly as possible with phosphoric or sulphuric acid before it is left to crystallize. If crystals or a granular gelatinous mass is obtained, they are to be collected on a linen cloth, and after being slightly expressed, are to be purified by another crystallization. The alkaloid is now to be isolated in the

usual way; that is, a solution is to be made in a small quantity of water, and soda, potash or ammonia, or what is better, pure magnesia, carefully added, the alkaloid is then to be re-dissolved by means of alcohol or sulphuric ether, from which it can be freed by distillation or evaporation.

If the vegetable base is volatile, some modification of the manipulation is necessary.

This matter has been applied to the extraction of quinine, cinchonine, strychnine, brucine, codeine, atropine, aconitine, caffeine, &c., and the results have shown that it may be attended with advantageous consequences.

Quinine and Cinchonine.—The product of an acidulated alcoholic decoction is to be taken, and treated with an excess of hydrate of lead, the clear liquid on being distilled will give a residue which is to be neutralized by acetic acid; this liquid being diluted and treated with tannin as above, will afford the alkaloids of bark.

By acting on the yellow uncrystallizable mother water of sulphate of quinine, I have readily separated both quinine and cinchonine.

Strychnine and Brucine.—In operating with tannin on the clear product of an acidulated decoction of nux vomica, I have obtained a precipitate of bitannate, from which I separated strychnine and brucine by means of boiling alcohol of 18° to 35°; these were combined with sulphuric and acetic acids, and thus afforded me a very white and crystallized acetate of strychnine, and an equally good product of sulphate of brucine.

Codeine.—This alkaloid which is not met with in all the opiums of commerce, or at least in very minute quantities in some of them, is so perfectly characterized as to leave no doubt of its existence. It is, however, only by operating on very large quantities of opium that it can be successfully obtained. Having ascertained that by the acid of tannin it was possible to extract small proportions of codeine from a fluid containing it, I followed the following plan, operating on two or three ounces of opium only:

The opium was exhausted by warm water; the solution was filtered and properly concentrated, and a great excess

of ammonia added to precipitate the morphine and narcotine. The ammoniacal liquid was evaporated, there was a white precipitate of meconate of lime which was separated by the filter; and when four-fifths of the fluid had evaporated, it was neutralized and tannin added; the precipitate that ensued was treated as before described. After the distillation of the alcoholic tincture, a brown, pitch-like, bitter product, which was capable of saturating acids, was left. When carefully united with nitric acid, it afforded, after two purifications, silky crystals, from which codeine was precipitated by means of potash; this precipitate was soluble in ether and alcohol; boiling water also dissolved it, and on cooling presented at its surface a sort of oil which rapidly changed into prismatic crystals. These crystals were readily soluble in ammonia, and formed a salt with acetic acid, which was not deliquescent, whilst with morphine the contrary is the case.

Emetine.—M. Boutron and I have also succeeded in obtaining white, pulverulent emetine from ipecacuanha, by means of this process.

Atropine and Aconitine.—Some months since I presented to the Society of Pharmacy, a crystalline substance obtained from the root of the belladonna, by means of tannin. These crystals, which were bitter, were decomposable by heat, soluble in alcohol, precipitated from this solution in flakes, on the addition of water; when saturated with sulphuric acid, they afforded a granular, pulpy mass, furnishing an abundant precipitate by means of tannin. I considered them to be *atropine;* they could not be asparagine, or an ammoniacal salt, as these substances are not affected by tannin. I have since repeated my experiments, (the root of the belladonna was treated with acidulated, warm water, filtered, saturated, an infusion of nut galls added, the precipitate washed, treated with lime, &c.,) and although it was with difficulty that I obtained crystals, I extracted a brownish, very acrid, bitter product, which saturated sulphuric and phosphoric acids, forming a granular, gelatinous mass. These salts dissolved in water and decomposed by means of pure soda, gave a gelatinous mass which when collected on a linen cloth, assumed a crystalline appearance. They were soluble in al-

cohol, precipitated by water; bitter, acrid, and afforded an abundant precipitate with tannin.

A watery extract of the fresh leaves of the aconite, treated with tannin, gave me, after the evaporation of the alcohol, a brown residue, which, redissolved by means of an acid, then filtered and decomposed by potash, afforded a very bitter, acrid, flocculent, whitish precipitate, soluble in alcohol, and fusible by a gentle heat into a sort of resin. This product had a great resemblance to what has been described under the name of *aconitine.*

Caffeine.—M. Boutron has successfully made use of this process to extract caffeine.

Application of Tannin in the detection of very minute quantities of the Alkaloids.—It often becomes necessary to ascertain the presence of very small quantities of certain of the poisonous vegetable alkalies, which have been added to wine, soup, coffee, &c., with a criminal intention. By means of tannin I have obtained results, which I am of opinion are of no little importance in their applications.

Some years since M. Dublanc, Jr. proposed a similar method to detect morphine in cases of poisoning, and M. Orfila observes, "this plan consists in evaporating the suspected mass to dryness, treating it several times with boiling alcohol; adding a tincture of galls to the alcoholic solution, which precipitates the animal matter, leaving a compound of morphine and tannin in solution. The fluid is then to be diluted with water, and gelatine added, and the alkaloid isolated by means of alcohol." M. Orfila, however, adds that after several trials he was not satisfied of the advantages of this method.

Whether the gelatine only effects a partial decomposition of the vegetable salt, or from some other cause, this plan has never been attended with the desired success.* From the good effects I had obtained with tannin, in the extraction of the vegetable alkalies, I was of opinion that it would prove

* Since the above was written, M. Pelouze has stated that the cause of the failure of M. Orfila, was probably owing to his having used tincture of galls that had been too long prepared, in which gallic acid had replaced the tannin.

useful in these cases, and the following experiments have proved the truth of this opinion:

1. I took one and a half to two grains of well crystallized morphine, strychnine and brucine, each of these salts were dissolved in half an ounce of water, with the addition of one drop of a very much diluted acid, tannin was added to the solution; the abundant, white cheese-like precipitate, was collected on a linen cloth, washed and mixed with a small quantity of slacked lime, the mixture dried on a water bath, reduced to powder, and treated with boiling alcohol at 36°. The evaporation of the menstruum was carried on in a watch glass, and always afforded me the vegetable alkali in a crystallized state, or susceptible of forming the most beautiful crystals on the addition of an acid: thus with the morphine I formed a silky plumose hydrochlorate, with the strychnine a white, acicular acetate; and with the brucine a prismatic and acicular sulphate.

2. I added the above salts in the same quantities to soup, wine, coffee, sugar, flour, &c., and operated as above on the liquids; in the case of the flour I removed the alkaloid by means of cold water, acidulated with a few drops of very weak sulphuric acid; then filtered and added the tannin.

In all cases I isolated the alkaloids which were dissolved in weak acids, to get rid of the fatty and colouring matters of the soup, wine, &c. The acid solutions were carefully concentrated on watch glasses, and afforded me the organic salts in well characterized crystals.

3. Finally, I made mixtures of soup, wine, &c., with two drachms of laudanum on the one part, and with a decoction of half an ounce of powdered nux vomica on the other. The mixtures being rendered almost neutral, were subjected to the same mode of treatment, and afforded me very distinct crystallizations of the alkaloids.

To conclude, these experiments which I repeated several times, and which only require a little care in their performance, always succeeded with me; and I do not hesitate to publish them as susceptible of useful applications; I moreover think, that after the ingestion into the stomach of the poison-

ous organic salts, that by means of tannin all of them that have not been absorbed, may be separated from the fluid and other contents of that viscus. I would also add, that pure tannin might be administered with success as an antidote against several of the vegetable poisons.

From the above it may be concluded:

1. That pure tannin, or substances containing it, forms very abundant whitish precipitates which are in the state of hydrates, and almost insoluble in cold water, when added to solutions containing vegetable organic salts.

2. That these compounds, whose insolubility permits the extraction of very minute proportions of the vegetable alkalies, are composed of one atom of base and two of tannin, and must hence be considered as bitannates.

3. That this property of tannin leads to very useful applications, as well in the extraction of the vegetable alkalies, as in the detection of them when criminally administered.—*Journ. de Pharm.*

ART. XLVIII.—EXTRACTION OF PLATINA IN RUSSIA.

By P. Sobolewskoy, Chief Engineer of Mines.

The discovery of Platina in the Russian empire, forms a remarkable epoch in the history of this metal; in 1822 it was found in the gold washings of the Ural, but the discovery of mines of this metal was not made till 1824. Since that time the product has increased from year to year, and at present is estimated at upwards of 110 pouds per annum.

From the middle of 1824, to January, 1834, nearly 476 pouds of pure platina have been obtained, of which 400 have been coined, and the remainder used for assay vessels, &c.

The platina of Ural has hitherto been only found disseminated through sand. The richest locality is in the mines of

Tagil, belonging to the heirs of Nicholas Nikitisch Demidoff: it is found near the surface, under a layer of earth, mixed with a greenish sand, which evidently owes its origin to a mixture of hornblend, greenstone and serpentine. This sand contains .00025 to .00075 of crude platina; this sometimes is in fine grains, sometimes in flat spangles, but it is not rare to find large masses. In June, 1827, one was met with that weighed 10 pounds 54 solotniks: in March, 1831, another was found weighing 19 pounds 52½ solotniks. Since then a fragment of 20 pounds, 24 solotniks; another of 19 pounds 24 solotniks, and finally, two of upwards of 13 pounds have been discovered.

The crude platina of Ural closely resembles that of America in its composition; there are three different kinds, distinguished from each other by the quantity of platina they contain: it is always accompanied by its usual concomitants namely, palladium, iridium, osmium, and rhodium. The proportions of these metals have been determined by the experiments of Berzelius. The three kinds of crude platina of Ural need not be described, they are designated as 1, crude platina from Goro Blagodat: 2d, crude platina from Tagil: 3d, osmium-iridium: this last is the poorest in platina.

Among the numerous modes proposed to reduce platina to a malleable state, that proposed by a French jeweller, Jeannetty, was for a long time exclusively made use of; this as is well known, is based on the fusibility of platina when mixed with arsenic. Being afterwards wholly abandoned on account of the great danger to which it exposed the workmen, when used on a large scale, it was replaced by those of Breant and Wollaston. These two chemists were very successful for many years in reducing platina, but kept their processes secret, and it was not till 1828, a short time before his death, that Wollaston made his public. It is somewhat different from that pursued in Russia, of which, however, we have had no exact account until the publication of the present memoir.

The whole operation is divided into two distinct series of manipulations: the first designed to separate the crude plati-

na from foreign substances; the second to render this platina malleable. To obtain pure platina, the crude metal is dissolved with the assistance in *aqua regia*, (composed of three parts of hydrochloric and one of nitric acid, experience has shown, that the most advantageous strength is 40° B. for the nitric, and 25 for the hydrochloric.) The solution is made in open porcelain capsules, holding from 25 to 35 pounds; these when filled with a sufficient quantity of acid and platina, are placed on a sand bath capable of accommodating about 30. This sand bath is situated under a hood, closed on all sides with moveable glass windows, and openings for removing the capsules; from this arrangement, all the acid gasses are carried up the chimney.

This operation lasts from eight to ten hours, or until no more red vapours are given off; at this time the solutions contain a great excess of hydrochloric acid, but this excess is indispensable to the retention of a greater part of the iridium, &c., when at an after part of the process the platina is precipitated.

After the solution is effected, the liquor is decanted into large earthen vessels, and sal ammoniac added, the precipitates thus formed, are permitted to become deposited; they are then washed several times with cold water, dried, and heated to redness, in platina crucibles; in this manner the platina is obtained in a spongy state. The degree of its purity, principally depends on two circumstances: 1st, that the solution contains an excess of acid, to retain the iridium; 2d, that the precipitate has been well washed. This last precaution, augments, it is true, the washings, and their evaporation is one of the longest parts of the process; but the combination of platina and ammonia is thus perfectly freed from all admixture with foreign metallic chlorides, which would be injurious to the malleability of the platina.

The washings are divided into two portions, and treated separately; the first are poured into glass retorts, and evaporated on a sand bath to one-twelfth of their original bulk; on cooling, there is a deposit, of a combination of ammonia

and iridium, part in the form of a deep purple powder, and part in regular octahædrons.

The other washings are evaporated to dryness in porcelain capsules: the residue is heated to redness, and then treated with *aqua regia.* The platina obtained from these washings is rarely pure, and must be re-dissolved, as otherwise it would not be malleable. When this spongy platina is dissolved a second time, a little iridium is generally found in the state of an insoluble residue.

The differences between this process and that of Wollaston are, that this chemist uses aqua fortis, and dilutes the hydrochloric acid with an equal proportion of water; by a digestion of the crude platina in this menstruum for three or four days, he avoids the solution of the iridium. It is possible, says M. Sobolewskoy, that this method may attain the desired end, on a small scale, but in large operations, it is indifferent whether the first solutions contain less iridium, as the remainder of the crude platina will retain a much larger proportion, and its quantity will go on progressively increasing in each succeeding solution, for the solubility of the iridium is in a direct ratio to the quantity of it, mixed with the crude platina. Moreover, experience has shown that the presence of iridium in solutions of platina does not injure the purity of this metal, if care be taken to keep the acid in excess, and if the precipitate be well washed. The employment of weak acids occasions a great loss of time. The concentrated acids, on the contrary, although dissolving a portion of iridium with the platina, offer the most simple and effectual means of extracting the latter from its combinations.

The solution of one part of platina requires ten to fifteen parts of *aqua regia*, of the indicated strength. The proportion of acid to be employed must depend on the size of the grains of platina, and their texture. That of Tagil which is in large fragments requires more acid than the fine grains.

The purified platina is forged in the following manner: the spongy mass, is reduced to powder in a brass mortar, by means of a pestle of the same, then passed through a fine sieve; with this powder a cylindrical iron tube is filled, and subjected to

great pressure by means of a steel rod acted on by a powerful press; after it is sufficiently compressed, it is taken from the mould, and is now in the form of a solid, flat cylinder, or disk, of great density, but the molecules have so little cohesion, that a blow is sufficient to destroy their continuity. When a sufficient number of these disks have been made, they are heated to redness, in a porcelain furnace; this part of the operation lasts for near a day and a half, when the platina has been well purified, and above all well washed, as directed above, the disks are now malleable and fit for use.

It is worthy of remark, that however great may have been the pressure to which the platina has been exposed, its bulk is always diminished by the action of the furnace. A disk of platina, which, when taken from the mould is four inches in diameter, and 3-4 of an inch thick, loses when heated to redness, 3-4 of an inch in diameter, and 1-4 in thickness.

The platina is then forged into bars, or rolled into plates; if the metal has been well purified, these operations require no particular attention.

In the laboratory of the mines, the operations are so carried on, that each day a poud of platina may be purified and forged into bars. The expenses of producing a pound of forged platina, are estimated at about 29 roubles.

Jour. de Pharm.

ART. XLIX.—ON THE CONEINE OF GEIGER. By M. Deschamps.

It was announced in the "Gazette Medicale" for March 1832, that M. Geiger, Professor in the University of Heidelburg, had succeeded in obtaining the active principle of conium. This coneine he described as a volatile alkaloid, united in the

plant to an acid which retains it on a distillation with water alone, but allows it to pass over if a solution of potash be used. Its odour, he continues, is extremely penetrating, pungent, and disagreeable, resembling that of mice. This alkaloid is easily decomposed, and it appears probable, says the author of the article in question, that coneine exists only in the fresh plant, as he has never been able to detect it when in a dried state. The coneine contained in the extract made from the fresh plant, is soon decomposed. The seeds, however, retain it for a long time, as the author detected it in some that were sixteen years old.

It is difficult to conceive how this principle which is retained so strongly by an acid, as to require a high temperature and a powerful base to extract it, can disappear by the mere process of drying. There must be some other cause than mere temperature to occasion this. I thought at one time that humidity might perhaps aid in this decomposition.

To investigate this phenomenon, I began by endeavouring to obtain the coneine of M. Geiger. After having subjected the fresh plant to a prolonged distillation with water, to deprive it of its essential oil, I placed the plant and the liquid remaining in the still, in an earthen retort, and having added some caustic potash, adapted a worm to the retort and distilled. The liquid that was obtained reddened turmeric paper, and restored the blue colour to litmus reddened by an acid. The colour of these tests was also changed when they were held over the vials containing the fluid. These characters evidently were characteristics of alkalinity and volatility. The smell resembled that of mice. These properties being noted, I supersaturated the liquid with acetic acid, and continued the distillation, and then evaporated the whole by a very gentle heat. I obtained a dark brown extract of a very disagreeable odour. A portion of this extract was placed in water, in ether, and in ley, and left to macerate for several days, then introduced into a retort and subjected to distillation. The product which was collected in a receiver, kept cold by a freezing mixture, was ether containing a volatile, alkaline principle, having a strong smell of cantharides. This

fluid, on the addition of a small quantity of sulphuric acid and subsequent evaporation furnished an odorous salt.

A second portion was treated in the same manner, but without ether. The product was volatile and alkaline; it formed white clouds on hydro-chloric acid being brought near it. When saturated with this acid and evaporated, it produced an odorous saline mass of a red colour. This mass, when dissolved in water, treated with animal charcoal and evaporated, gave a colourless and inodorous salt.

A third portion was treated in the same manner, but with potash. The distilled liquid was placed in a capsule, this capsule in a larger one containing weak hydrochloric acid, and the whole covered with a bell glass, and left at rest for a day at a temperature somewhat higher than that of the air. The fluid in the small capsule was somewhat alkaline, but lost this property on evaporation. That in the larger vessel gave a slightly coloured salt.

Extract of conium without chlorophylline, alcohollc extract prepared in 1832 and 1833, the extract of Caventou, that of Starck of 1832, that of Parmentier prepared some years before, extract of the seeds, the seeds themselves, and the dried plant, treated in the same manner, afforded the same results.

Some drops of the solution of these hydrochlorates, when evaporated on a piece of glass, presented the beautiful arborescent crystallization of hydrochlorate of ammonia, and all these salts on the addition of potash and at the ordinary temperature, disengaged ammonia, which was more or less pungent according to the colour of the salt.

The acetous vapour which passed through the plant in the preparation of the extract of Caventou, when collected and evaporated at a moderate temperature, gave out alkaline fumes on the addition of potash.

An acetous extract prepared by infusing the fresh plant in in water acidulated with strong vinegar, (de Mollerat) one drachm to the pound of plant, was preserved in a jar covered with paper. A year after its preparation, it was soft and odorous, its smell being analogous to that produced by the evaporation of the liquid obtained on the distillation of the

plant with potash, this liquid having been saturated with vinegar of a less strength. This extract afforded ammonia with great facility.

The extracts of conium, treated with hydrochloric and acetic acids, aided by heat, and potash afterwards added, gave out an odour of ammonia and cantharides; this disappeared on the addition of an acid, but was restored by saturating this acid with alkali.

To determine the source of the ammonia, five grammes of of the extract of conium were placed in a capsule with an alcoholic solution of potash, and heated for an hour in an oil bath, adding distilled water from time to time. To this liquid, acetic acid in excess was added; this produced a brisk effervescence. The filtered fluid precipitated nitrate of lead. The precipitate washed and dried, was partly crystalline. Decomposed by hydro-sulphuric acid, after filtration and evaporation a small quantity of crystals were obtained, some of which were flat, and the others in prismatic needles. These crystals, treated with alcohol at 35° B. gave on evaporation, by a gentle heat, very acid, acicular crystals. Calcined on a leaf of platina they gave an odour of tartaric acid, and left a residuum which reddened turmeric paper. These facts suffice, in my opinion, to characterize malic acid; this acid has been discovered in conium by Schrader, and M. Braconnot has ascertained that alcohol, in contact with unpurified malic acid, will dissolve malate of lime.

Eight grammes of the same extract were treated in a retort, furnished with a long tube, the extremity of which was plunged into mercury, to get rid of the carbonic acid, and the above process repeated with the same results.

M. Guersent states (*Dict. des Sci. Med. art. Cicuta,*) that a physician of Edinburgh was of opinion, that an extract prepared with seeds, was more efficacious than that made from the plant, but that experience has not verified this idea.

We may conclude from the above:

1st. That extracts of conium, more than six weeks after they have been prepared, and even the dried plant, when exposed

to atmospheric variations, disengage ammonia when treated with potash.

2d. That the odorous principle which accompanies the ammonia, is not alkaline, that it does not saturate acids, and unites with charcoal like a colouring matter.

3d. That the coneine of M. Geiger owes its alkalinity to ammonia.

4th. That if the active principle of conium is an alcaloid, it is still to be discovered.

5th. That the extrication of carbonic acid, resulting from the action of potash on the extract, by the addition of nitric acid, and the disengagement of ammonia, indicates that these bodies are formed under the influence of the potash, at the expense of a peculiar body, as yet unknown.

6th. That the alteration of the acetic extract of conium tends to prove that the acetic acid, after having taken up this principle, and destroyed its natural combinations, again abandons it, from its property of forming unstable combinations only, and that this body, thus set at liberty, is decomposed.

7th. That the action of hydrochloric and acetic acids on the extracts, are thus explained.

8th. That the seeds have less activity than the plant.

9th. That the extract without chlorophylline, and the alcoholic extract prepared with fresh conium, and alcohol at 35° B. are the most active preparations.

10th. That the method of M. Caventou is liable to destroy some of the properties of the conium.

The advantage of his extract, if its greater efficacy be admitted, would reside in the combination of the active, volatile principle with the acetic acid. If this be the case, it is evident that the fresh plant is preferable to the dried, and that the whole preparation might be reduced to pounding the plant, extracting the juice, freeing it from the chlorophylline and albumine, adding acetic acid 3i. to the lb. evaporating and preserving the extract in a close vessel. This mode of preservation ought to be adopted with all extracts which

attract humidity. An easy plan is to cover the pot with a disk of glass, maintained in its place by a luting.—*Journ. de Pharm.*

Note.—The committee appointed to report on the above memoir, M. M. Planche and Boutron, appear to think that the author has not fully established his conclusions. They give the original process of Geiger, of which it would appear that M. Deschamps was ignorant, and hence, perhaps, failed in his endeavour to separate the active principle of conium. This process is as follows: "To obtain coneine, fresh conium is to be distilled with caustic potash and water, as long as the product has any smell. This product is to be saturated with sulphuric acid, and evaporated to the consistence of a syrup. Absolute alcohol is added till there is no precipitation of sulphate of ammonia. The alcohol is to be distilled, and a very concentrated solution of caustic potash added to the residuum, and the distillation repeated." They also state that M. Soubeiran, who repeated this process, obtained a substance identical with that described by the German chemist.

ART. L.—ON CAPNOMOR. By Dr. Reichenbach.

In the preparation of the different substances obtained by Dr. Reichenbach from the product of the dry distillation of organic bodies, this able chemist had constantly to guard against a peculiar oily body, which resisted all direct modes of separation. This body altered the purity, 1st, of Eupion, rendering its flame smoky; 2d, of Creosote, whose medical properties it greatly deteriorated; 3d, of Picamar, of which it diminished the specific gravity; and 4th, of Paraffin, the solidification of which it prevented. To get rid of it, Dr. Reichenbach adopted the following plan:

In distilling the wood tar, those portions only are to be

kept which are heavier than water. To remove the acetic acid, the product is to be mixed with carbonate of potash, till no effervescence is produced. The oil is to be separated and mixed with a cold solution of caustic potash of a specific gravity of about 1.20, stirring the mixture well. If it becomes solid on standing, (owing to the presence of a large proportion of picamar,) it is to be liquified by exposure to heat. All that is not dissolved on a second treatment with the potash is to be rejected. The alkaline solution is now to heated in an open vessel, the heat being slowly increased till ebullition is produced, which is to be permitted for a few instants only, when the fire is to be allowed to go out; after the fluid is cold it is to be decomposed by a slight excess of diluted sulphuric acid; this sets free a large quantity of a brownish black oil. It is now to be poured into a retort, and so much of the solution of caustic potash added as to render the mixture alkaline, and the whole distilled, but not to dryness. The product of the distillation, which is oily, transparent, and of a pale colour, is to be dissolved in a solution of caustic potash of a specific gravity of about 1.16, and the above process repeated; that is, the undissolved portion is to be rejected, the solution heated to ebullition in an open vessel, permitted to cool, diluted sulphuric acid added, the oil separated, potash added till the fluid is rendered alkaline and the distillation repeated. These operations are to be renewed several times, diminishing the strength of the solution of potash at each repetition to 1.12, 1.08, 1.05. Each time a residue of insoluble oil is obtained in the alkaline solution, and it is these residues that contain the substance under consideration, but the two last in the state of the greatest purity, and hence they only should be used to obtain it. As they retain a portion of creosote, a solution of potash of a specific gravity of 1.20 is to be added to them, the mixture well stirred, permitted to settle, decanted and distilled. The product of the distillation is colourless, and it is to be mixed with great precaution, very gradually, and constantly stirring, with an equal volume of fuming sulphuric acid; the mixture becomes somewhat

red, and there is scarcely any disengagement of sulphurous acid.

When the preceding operations have been properly performed, the oil dissolves without residue in the sulphuric acid; if not, a white, transparent oil (impure eupion) will be found floating on the acid; the solution is to be permitted to stand for a few hours, or till it is perfectly cold, when it is to be mixed with twice its quantity of water. It becomes hot and turbid, and a small quantity of oil rises to the surface, and is to be removed. The mixture is then to be neutralized with ammonia, and left to clear, after having removed any portion of oil that may have separated, it is to be distilled in a glass retort. At first, water containing ammonia and a small quantity of oil will pass over; these are to be rejected, then pure water, and finally, when the residue begins to become dry and the temperature is increased, oil passes over which was closely united to the ammoniacal salt; this oil is to be again dissolved in an equal volume of sulphuric acid, the mixture diluted with water, neutralized with ammonia and redistilled. The oil which comes over at the close of this process is to be washed with a solution of potash, and distilled once or twice, till the oil obtains a specific gravity of 0.98. A small residue of oil mixed with some foreign matters will remain in the retort. Finally, the oil is to be digested with fresh and dry chloride of calcium, which is to be several times renewed, and the process terminated by rectifying the product over a spirit lamp.

Dr. Reichenbach has called this oil *capnomor*, signifying *part of smoke.* It is a transparent, colourless fluid; its refringent power is equal to that of creosote. Its smell is not very powerful, but is agreeable and aromatic; some persons compare it to that of ginger, others to that of rum; its taste is at first scarcely perceptible, but in a few moments becomes more powerful; it is neither bitter, acid nor sweet; it evaporates rapidly, without leaving a trace, if its specific gravity is 0.9775 at a temperature of 20° C. It boils at 185° C.; but does not congeal at 21° C. It leaves greasy traces on paper

which disappear at the usual temperature in an hour to an hour and a half.

Capnomor has no action on litmus or turmeric; it does not absorb oxygen from the air even when heated; it burns in giving out much smoke. It is almost insoluble in cold water, and but slightly acted upon by hot. It is, however, taken up in all proportions by alcohol, sulphuric and acetic ether, picamar, eupion, petroleum, carburet of sulphur, essence of turpentine and creosote. When united with chlorine or bromine, it gives rise to an elevation of temperature, and the formation of hydracids and new oily substances which Dr. Reichenbach thinks are analogous to chloral and bromal. If the purity of capnomor is adulterated by the least trace of the oil from which pittacal is obtained, it produces, on contact with chlorine, a violet colour which changes to yellow when the capnomor is saturated with the gas. It dissolves a large proportion of iodine, becoming of a brown colour; it also dissolves phosphorus, sulphur and selenium. Weak nitric acid colours it of a deep brown; when more concentrated, decomposes it, giving rise to carbazotic acid, a great quantity of oxalic acid, and a new crystalline body. Sulphuric acid of a specific gravity of 1.850 dissolves more than its own weight of capnomor without decomposing it; the temperature of the mixture becomes raised, but there is no production of sulphurous acid. Hydrochloric, hydrobromic and hydriodic acids have no action on it.

It is very slightly soluble in acetic acid, and itself dissolves some of the other organic acids, though in small proportions. Succinic acid, however, is very soluble in it when aided by heat, but crystallizes almost entirely on the cooling of the solution; and the carbazotic, benzoic, margaric, oleic and stearic acids are dissolved in it in large quantities, even when cold. Potassium, sodium, potash and soda have very little action on this body; ammonia and the hydrates of lime and barytes, none. Like creosote, it combines with some salts, as the sulphate of potash and sulphate of ammonia.

It dissolves, even when cold, camphor, paraffin, napthaline, myricine, mastic, benzoin and colophane; it swells caoutchouc,

and completely dissolves it with the assistance of heat; if the solution be heated on a glass, the oil evaporates, leaving the caoutchouc in an unaltered state. It also dissolves some of the alkaloid and neutral bases, without heat, whilst others are soluble only by the aid of this agent.

Capnomor is distinguished from creosote and picamar, by its taste, by its almost total insolubility in acetic acid, by its insolubility in the alkalies, and by the facility with which it dissolves caoutchouc; from eupion by its specific gravity, by its point of ebullition, by the smoke it emits in burning, by its solubility in sulphuric acid, by its decomposition by nitric acid, by the property it possesses of dissolving carbazotic acid, &c.

This new substance is found in all tars, even in that of coal, and likewise in Dippel's animal oil. Its use is as yet unknown.

Journ. de Pharm.

ART. LI.—PRODUCTS OF THE DISTILLATION OF PIT COAL.

By F. F. Runge. (Poggendorff, Annalen xxxi. 65.)

From the oil of pit coal rectified over oxide of copper, three bases and three acids are partly separated, or are partly formed, which differ in their chemical properties from any substances hitherto observed.

BASES.

1. *Cyanol.*

Cyanol (blue oil) is a volatile substance, almost destitute of any peculiar smell, neutralizing acids and forming salts which partly crystallize. It produces in a solution of muriate of lime a blue colour, which is removed by an excess of chlorine. The salts of cyanol dissolve in solutions of muriate of lime, producing a fine violet blue colour, which by free chlorine is converted into orange. They impart to the colourless solution of the white pith of the elder and pine wood, an intense yellow colour, which is not destroyed by chlorine,

at least under the circumstances in which other organic colours disappear. Thus, a piece of Turkey red cotton speedily loses its colour, when after being moistened with oxalic or tartaric acid it is immersed in a solution of muriate of lime. Paper, cotton, linen, wool, and silk are not coloured yellow. The effect of the salts of cyanol in colouring pine wood is so strong, that a drop containing only $\frac{1}{500,000}$ of cyanol produces a distinct yellow colour in the wood. The yellow colouring is not imparted to the fibrous part of the wood, but to a peculiar matter in the wood which also exists in other species of trees. The resin has no connexion with this colouring power.

The oil of pit coal contains a great quantity of cyanol, whose presence is easily detected by mixing one part of oil with a solution of twenty water and one part muriate of lime. The oil becomes dark red and the solution assumes a blue colour, similar in intensity and appearance to the moist ammonia sulphate of copper. It is changed by the muriate of lime into an acid which forms compounds possessing a blue colour.

Cyanol is very readily detected by muriatic acid, when coal oil is mixed with the latter in the proportion of three volumes to one. The acid becomes brown; and a splinter of fir wood introduced into the solution, has the yellow colour already described communicated to it, thereby indicating the presence of cyanol.

2. *Pyrrol.*

Pyrrol (red oil) in a pure state is a gaseous body possessing the odour of turnips, (*markochen ruben*) and may be detected by dipping a stick of fir moistened with muriatic acid in a vessel containing pyrrol, when it is tinged purple red, and which like the effect of cyanol is not removed by chlorine. Paper, &c., treated in the same manner remains colourless. The colouring power of the compounds of pyrrol is not less strong than that of cyanol. Nitric acid produces in the aqueous solution of pyrrol a red colour.

It is difficult to detect pyrrol in coal oil, as the cyanol and carbolic acid render its reaction indistinct, but it may easily

be discovered in water which has been employed to wash common street gas, by saturating it with muriatic acid, and dipping into it a stick of fir. A purple red colour is occasioned.

Pyrrol forms the principal constituent of empyreumatic ammonia, and when its peculiar smell is known, it may be distinguished among the odours which are disengaged by the distillation of bones and horns. Pyrrol is also contained in tobacco oil.

ACIDS.

1. *Carbolic Acid.*

This acid is a colourless oily substance, sinking in water. Its smell is extremely empyreumatic; it is caustic and burning, and has a strong action on the skin. When the skin is rubbed with it a feeling of burning is felt, and a white spot is produced, which on being touched with water becomes red, and in some days desquamates. In this respect it corresponds with creosote, but differs in being acid; in being precipitated by acetate of lead, and in not being altered by ammonia or the atmosphere, and in being converted by nitric acid even diluted into a reddish brown matter.

Carbolic acid dissolves in water. The solution is colourless and the acid is easily rendered conspicuous with nitric acid. The water is at first yellow or orange, and afterwards reddish brown; a stick of fir plunged in dilute carbolic acid, takes after being moistened with muriatic acid in half an hour, a blue colour. The vapour of muriatic acid also tinges shavings moistened with carbolic acid of a blue colour. This tinge withstands the action of chlorine in a high degree.

The salts of carbolic acid are colourless, and many of them can be crystallized; their aqueous solutions present the same appearances with fir as the solution of carbolic acid. Carbolic acid precipitates albumen, prevents organic substances from putrefying, and removes the putrid smell of meat when digested with an aqueous solution, much better than chlorine. The presence of carbolic acid may be detected in

coal oil by mixing it with lime water, filtering and evaporating to the consistence of a syrup. Muriatic acid separates impure carbolic acid from this mass, which is impure carbolate of lime.

(To be continued.)

ART. LII.—CULTIVATION OF THE POPPY AND MODE OF PREPARING OPIUM.

Mr. C. Texier, who is at present exploring Asia Minor, has transmitted from Constantinople to the Academy of Sciences of Paris, the following details respecting the cultivation of the poppy and the preparation of opium.

The seeds are sold at Kara-Hissar by measure of 60 ocques at 20 paras, the ocque, that is 30 piastres, (or about a dollar and a half.) The ocque of Constantinople is equal to about $2\frac{3}{4}$ pounds. They begin to work the earth in December by means of a hoe, or sometimes with a plough. The furrows are sufficiently large to permit persons to pass without damaging the stems of the poppies, which are planted in beds of three feet and a half wide. The seeds are sown broad cast but very thin. One ocque is sufficient to sow 1600 square metres. A few days after the flowers have fallen, the heads are slit horizontally, taking care that the cut does not penetrate to the interior. A white milky juice exudes, which is left for twenty-four hours, and then scraped off with large, dull knives. Each head furnishes but a few grains of opium. The drug is sophisticated by portions of the epidermis being mixed with it, thus increasing the weight about a twelfth. The opium is now in the form of a sticky granular jelly. It is placed in small earthen vessels and pounded, the operator spitting in it from time to time. When the peasants are asked why they do not use water instead of saliva, they reply that water would injure it. The opium is then wrapped in dry leaves, and is fit for sale. The seed is not injured by cutting the heads.

The quality and abundance of the crop are favoured by the absence of heavy rains during May and June, a few days rain being sufficient to cause a great loss.

On the above being read, M. Guibourt stated that in his opinion this mode of collecting and preparing opium, was peculiar to the spots visited by M. Texier, but that it is not probable that the opium of commerce is thus manufactured; as it is not noticed by other travellers, and also that an inspection of good opiums of commerce, show that they have not undergone such manipulations.

M. Guibourt has already proved (*Dict. de Med. et de Chirur. prat.* art. Opium) that it is erroneous to suppose that we do not possess the true *opium* of the ancients, or the product of an incision of poppy heads; and to say that we have only the *meconium* or the product of the expression or decoction of the plant. M. Guibourt is satisfied that the Smyrna and even good Constantinople opium, (grown in part of Natolia,) are the product of incisions of the poppy head, and adduces in proof, that by carefully tearing these opiums and observing the fracture with a magnifying glass, they appear to be formed of small tears or drops, agglutinated together. It is evident that they have undergone no other preparation than that of being formed into cakes, and when sufficiently dried, each enveloped in a leaf of the plant, and in the Smyrna opium also with seeds of a *Rumex*, which however does prevent the cakes, in many instances, sticking together and becoming united.

This Smyrna opium exactly agrees with the description of Belon: "The best of opium, says he, is very bitter, hot to the taste so as to burn the mouth. It is of a yellow colour, approaching that of the skin of a lion, the masses are composed of a number of small grains of different shades of colour. For in collecting the said opium, the grains obtained from the different poppy heads are united together."

Olivier does not speak of any other preparation of opium, and the concurrence of these two travellers, joined to the physical characters of the Smyrna opium, does not furnish a doubt of the mode in which it is manufactured.

But another method of preparing it does exist; this is mentioned by Dioscorides and Kœmpfer. According to the former, the juice collected from the capsules, for two successive days, is mixed together in a mortar; according to the latter, "it is moistened with a *little water*, so as to soften it, when it is well worked in a wooden bowl, with a wooden spatula, till it acquires the consistence, colour and tenacity of malaxated pitch. When it has been thus worked, it is several times stretched out and rolled with the hands, and then made into cylinders."

The opium prepared by either of these processes will not present the drops or tears so distinct in the Natolia, but will resemble the uniform texture of the Egyptian and Persian. M. Guibourt has specimens of the Persian opium given to him by Mr. Morison, of London, which has all the characters spoken of by Kœmpfer. It is in cylindrical pieces, which have sometimes become square from their pressure on each other; they are about four inches and a half long, and about five or six lines thick, wrapped in satin paper and tied with a cotton thread. Each stick weighs about 20 grammes; internally they are uniform, reddish, presenting some appearance of agglutinated tears, when viewed with a magnifying glass, but of a smaller size than those of the Smyrna opium. It has a virous smell, mingled with mustiness, which also characterizes the Egyptian variety, prepared in the same manner.—*Jour. de Pharm.*

ART. LIII.—ON IODOUS ACID.—By M. Sementini.

Considering that nitrous acid was nothing but nitric acid, *plus* nitrous gas, M. Sementini was led by analogy, to think that an acid resulting from the combination of iodic acid with the oxide of iodine, should be called iodous acid. Having effected this combination, he obtained a fluid of an amber yellow colour, which when kept in a close vessel, lost none of its colour, but soon became colourless, when exposed to the

action of the air; the oxide of iodine being dissipated in the same way as nitrous acid gas loses its colour by the volatilization of the oxide of azote.

This combination does not take place in all proportions, but in definite quantities; for, if oxide of iodine in excess be added, it is decomposed, and the iodine precipitates. The author thinks that this phenomenon can only be explained, by admitting, that when the dose of oxide of iodine is sufficient, the iodous acid which forms immediately, decomposes the oxide, by depriving it of its oxygen, and is itself again converted into iodic acid; and, in fact, during the precipitation of the iodine, the yellow colour of the liquid disappears. This M. Sementini thinks is a strong proof, of the intimate union which takes place between the two compound substances, each of which, evidently acts on the other. He has prepared iodous acid by combining one hundred parts of solid iodic acid dissolved in water with three parts of oxide of iodine of the greatest density.

Although the analogy which exists between nitrous and iodous acid appears to intimate that this latter would not form iodites, as nitrous acid forms nitrates and not nitrites, he has combined iodous acid with ammonia; the union took place without the disengagement or precipitation of iodine, although the yellow colour disappeared at the moment of the combination of the acid with the alkali. The solution on evaporation, furnished a salt differing from the iodate of ammonia in many particulars.

The iodite of ammonia is less efflorescent, its taste is less saline, it detonates when heated in an open vessel, disengaging vapours of iodine for a long time; its colour is of slight green. The solubility of the two salts is very different, the iodite being soluble in one half less water than is required to dissolve the iodate. M. Sementini has not given an exact analysis of these two salts, but having detonated equal quantities of each in a proper apparatus, he observed the following results: a production of a much greater quantity of aqueous vapour from the iodite, and also a greater residuum of iodine.—*Journ. de Pharm.*

Miscellany.

Oil of Croton.—M. Soubeiran proposes some modifications in the mode of extracting the oil of the *Croton tiglium*. This acrid purgative owes its properties to different principles, as a very acrid, volatile oil (the crotonic,) and above all to a soft, brown resin. The oil is obtained by expression, but this mode gives but a small product, and hence, it is most advantageous to extract it by means of alcohol. M. Soubeiran fearing that those products were not identical, engaged Dr. Piedagnel to make comparative trials with them, the result of which proved that they were perfectly analogous in their medical properties. M. Soubeiran, therefore, advises the following method of obtaining the oil:

The seeds are to be ground, the powder enclosed in a hair bag, and subjected to pressure between two hot iron plates. The oil obtained is to be suffered to rest for two weeks, when it will deposit a large quantity of a half solid substance, which appears to be stearine; the whole is then to be carefully filtered. The residue after expression, is to be again ground and treated with twice its weight of rectified alcohol, in a water bath at 50° to 60° C., and subjected to pressure. The product when distilled will afford a thick oil containing stearine, from which it is to be freed as above, and the clear product added to the first, and kept in a well closed vessel. This process requires great care to avoid all contact with the seeds and the irritating vapours produced, and it is seldom an operator will escape some action on his system.

Bull. de Therapeut.

Grenadine.—This substance described by M. Latour as the active principle of the Pomegranate root, has recently been examined by M. M. Boutron Charlard and Guillemette, who are of opinion that it is identical with mannite, thus confirming the original analysis of M. Mitouart.

Journ. de Pharm.

Crystalline principle of the Melilot.—M. Vogel published in 1820 that he had discovered benzoic acid in the Tonka bean and the flowers of the melilot. M. Guibourt about the same time ascertained that the crystalline matter of the former was not benzoic acid, but a new principle to which he gave the name of *Coumarine*. This was confirmed by the experiments of M. M. Boutron and Boullay. No trial was however made to ascertain whether the crystalline matter of the melilot was also coumarine. Lately M. Chevallier and Thubuef announced the existence of a new crystallizable substance in the distilled water of melilot. Still

more recently, M. Cadet Gassisourt gave an account of a crystalline matter in the distilled water of the melilot, to which he gave the name of *melilotine*. About the same time, however, M. Guillemette examined the melilot with great care, and has shown: that the crystalline matter is not benzoic acid, as stated by Vogel, but an immediate neutral principle, having all the properties of coumarine, and consequently entitled to that name; that the distilled water of melilot owes its odour and properties to this substance. *Ibid.*

Combustion of zinc.—M. Sementini has observed a remarkable property in zinc. If when it is melted at a red heat, the crucible be withdrawn from the fire, the combustion of the metal will continue as long as any of it remains, provided it be continually agitated, and the oxide removed as fast as it forms. It would be curious to observe, by operating on large masses, whether this combustion would continue for a length of time without any other heat than that developed by the metal itself. By this combustion it forms a gray oxide differing from the common oxide; its specific gravity is greater, and it does not absorb carbonic acid from the atmosphere.

Journ. de Pharm.

Benzoic acid.—Giovanni Righini gives the following process for purifying benzoic acid. Dissolve the acid in four or five times its weight of sulphuric acid, diluted with six parts of water. During ebullition, add a very small quantity of the purest animal charcoal, filter, and while cooling, the acid will separate in crystals. Should long beautiful needles not be found, and should it still possess an odour, the operation must be repeated. Collect the crystals on a filter, remove the sulphuric acid by washing, and leave them to dry in the shade. Sulphuric acid dissolves the resin and oil, which renders the acid impure. To have this acid in beautiful crystals, dissolve in alcohol the purified acid, and put the solution in a subliming apparatus over a sand bath. Manage the fire in such a manner that the alcohol alone shall be volatilized, and long needles perfectly white, and without odour will be obtained.

Gaz. eclet. di Farm. and Ed. Med. and Surg. Journ.

St. Ignatius' bean.—From an analysis of this article by M. Jori of Reggio, it would appear that the active principle is united to tannin, as is the case with many other of the organic alkalies. The results of his experiments show that it is composed of: 1st, a very soluble, very bitter tannate of strychnine; 2d, of free tannine, which reacts like an acid, and strikes a dull green with the salts of iron and their solutions, and especially with the salts of the peroxide; 3d, of an organic alkaline salt—strychnine which is soluble in an excess of tannin, and is precipitated when this is

neutralized; 4th, of gum. 5th, of insoluble gum; 6th, of a great proportion of starch; 7th, of a small quantity of a resinous, aromatic substance. 8th, vegetable fibre.

Journ. de Pharm.

New Opium.—M. Guibourt has described an opium from the East Indies, sent him by Dr. Christison of Edinburgh. This opium is in flat black masses, about half an inch in thickness, and covered with a plate of mica. Dr. Christison stated that he had obtained nine and a half per cent of muriate of morphine from this opium, and thence concludes that it may be considered in some respects equal to the Smyrna, which furnishes ten per cent. of the same salt. *Ibid.*

Codeine.—M. Winckler has prepared codeine in the following manner: He treats opium with cold water, adds a solution of ammonia to precipitate the morphine, then chloride of calcium to precipitate the meconic acid. He afterwards separates the colouring matter by sub-acetate of lead; decomposes the excess of the metallic salt by sulphuric acid; adds caustic potash to the filtered liquid, exposes the mixture to the air, that any excess of this alkali may become a carbonate; then agitates the solution with ether, and after the spontaneous evaporation of the ethereal solution, he obtains the codeine in a yellowish transparent mass, which on the addition of hydrochloric acid affords fine crystals.

Journ. de Pharm.

False Guaiacum wood.—Under the name of false or female guaiacum, logs of a very compact, brown wood with a white heart, have been imported into France. This wood when split is sometimes yellow with brown or violet veins, or greenish with brown undulations of different shades. It is susceptible of a fine polish, which appears greasy; it has neither the taste, smell, or other properties of the true guaiacum. It is principally imported from St. Jago de Cuba, for cabinet work.

This is the green or yellow ebony of the Antilles. It appears that this wood is furnished by two different varieties of the *Bignonia leucoxylon*, and should not be confounded with the false guaiacum of Africa which is furnished by a species of *Schotia*, and has sudorific qualities.

Ibid.

Vienna caustic.—The slow action of caustic potash when used as a cautery, and the accidents that sometimes arise when it liquifies too rapidly, have determined many practitioners to make use of a new caustic, known under the name of *Vienna powder.* This is made as follows:

℞.	Caustic potash	5 parts.
	Powdered Quicklime	6 parts.

These are to be well mixed together and kept in a wide mouthed, glass stoppered bottle, and in a dry place. When it is to be used as a cautery, a small quantity of it is to be mixed with a few drops of alcohol or water, so as to form a liquid paste, which is to be spread between two pieces of adhesive plaster, the lower one of which is to be pierced with a hole of the size and form of the intended issue. The action on the skin is rapid though not very painful, and almost always is terminated in half an hour.

Ibid.

Origin of sulphur.—C. Gemellaro has read before the academy of Catania, a memoir, entitled, a new theory relative to the origin of sulphur. He supposes it originates in the decomposition of naked molluscæ, and that being acidified by the action of subterranean fire, it has been converted into sulphate of lime, and also has given rise to the sulphate of strontian, which in the tertiary class of Sicily is associated with the preceding minerals. *Am. Journ. Sci. and Arts.*

Ointment for the cure of scrofulous conjunctivitis.—M. Canon de Villard gives the following recipe for the treatment of this obstinate complaint.

℞.	Ol hepatis Rajæ	℥i.
	Cyanid. Ferri.	grs. xxiv.
	Cyanid. Hydrarg.	grs. viii.

Mix the oil cautiously with the cyanides, previously well agitated and then add, Ol. essent. lauro-cerasi. gtts. iv.

To prepare the oil, it is only necessary to take a sufficient quantity of the liver of that fish, and submit it to a slow heat, until it is so far prepared, that the oil can be obtained by expression. It is of a dark colour, and resembles cod liver oil, except that it becomes concrete on cooling. To give it more consistence, when necessary, a small quantity of spermaceti or palm oil may be added. This ointment is very active and must be cautiously used. At first it should be applied diluted with an equal proportion of simple cerate, and the strength increased as the eye becomes accustomed to it. *Bull. gen. de Therapeut.*

Oil of Euphorbia lathyris.—M. Soubeiran states that this oil contains an acrid resinous matter, which he considered as the active principle. Lately he has found this supposed resin to be a very compound body, and has extracted four very distinct substances from it, viz.; a white crystallized matter; a brown oil having a very disagreeable smell and acrid taste, readily soluble in alcohol; a kind of black resin which is insoluble in alcohol, and scarcely soluble in ether, but which is readily taken up by the fixed oils; and finally a solid, brown, pulverulent substance, which he has not yet examined. M. Soubeiran goes on to observe that the methods proposed by M. Chevallier to extract the oil, namely, by simple ex-

pression, by alcohol at a heat of 50° or 60° C., and finally sulphuric ether, cannot afford identical products. The first gives an oil much less charged with the resinous substances, and it is more than doubtful, whether the products of the two latter processes have the same properties. *Ibid.*

Syrup of Orgeat with milk.—

Sweet almonds,	750 grammes,
Loaf sugar,	3000
New milk carefully skimmed,	2000
Cherry laurel water,	
Orange flower water,	aa 125

The almonds, deprived of their pellicle, are to be pounded with four ounces of sugar and as much milk, when a homogeneous paste has been made, two pounds twelve ounces of milk are to be added and the emulsion strained, and the marc treated with the remainder of the milk and the aromatic waters. This second emulsion after being strained is to be united to the first, the sugar is then melted in it in a water bath, and the syrup thus formed strained through a coarse cloth and bottled when cold. *Ibid.*

Turpentine in Gonorrhœa.—Dr. Ebriart speaks in high terms of the efficacy of turpentine in the cure of gonorrhœa, after the inflammatory stage has been subdued by antiphlogistic measures. His formula is as follows:

R	Aq. Menth.	℥iv
	Terebinth. venet	ʒi
	Gum Arab.	q. s.
	Syrup simp.	ʒi
	Extract belladona,	gr. i

mix and make emulsion.

When this potion acts too immediately upon the intestinal tube, it must be intermitted for a few days.

Journ. des Con. Med. and *Am. Journ. Med. Sci.*

Digestive ointment of Dr. Canquoin.—

R. Acetic infusion of Mezereon,
Molasses,
Olive oil,
Ox gall, } aa ℥ʒiss.

Mix and reduce to the consistence of an ointment; then remove from the fire and add:

Ung. Basilicon,
Ung. de la mere, aa ʒiss.

Mix carefully and add to each ounce—

Sub-deuto nitrate of mercury, ʒi.

This ointment is used for indolent schirrous tumours of a dark red character. When cancerous and inflamed tubercles exist on the skin, the author destroys them by applications of a solution of cyanide of potassium made with ten or twelve grains of the salt to two ounces of distilled water. *Journ. de Pharm.*

Colour of eschars produced by various chemical agents.—

Nitric acid causes a yellow eschar, not very firm.

Nitrate of silver, a brown eschar on the skin, and a thin white one on wounds.

Caustic potash, a black semi-coriaceous, somewhat thick one.

Acid nitrate of mercury, a blood red one on the skin, a pale gray semi-coriaceous, somewhat thick one on the flesh.

Sulphuric acid, a semi coriaceous iron grey one.

Muriatic acid, a white, hard, somewhat thick one.

Nitro-muriatic acid, a yellowish, semi coriaceous, somewhat thick one.

Chloride of zinc, a white, very hard, thick one.

Arsenious acid, a livid, hard thick one.

Sulphate of copper, a brown, very hard, thick one.

Chloride of antimony, a white, soft, thick one.

Ibid.

Remedy against cancer.—The *Hippomanes mancinella* or manchineel has long been known as a most virulent poison; the Indians employ its juice to envenom their arrows, and it is also extensively used by the tribes inhabiting the banks of the Orinoco as an anticarcinomatous remedy. Numerous experiments have proved that arsenic is neutralized by the secretion of a cancerous ulcer, while it preserves its poisonous properties when placed in contact with any other sore. The same phenomenon is observed with respect to the manchineel, its poisonous effects being in like manner neutralised by the secretion of cancerous ulcers. The Indians when employing it, surround the cancerous sore with a pasty border, and apply to the centre of it a few drops of the juice of the manchineel, an eschar soon forms, which comes away in about 48 hours, leaving a clean wound. *Journ. de Con. Med. and N. A. Arch.*

Plaster in whooping cough.—M. Corsin says that he has recently obtained very prompt and happy effects in several cases of whooping cough, by the application of the following plaster between the shoulders:

R. Emplast. cicuta, ʒi.
" Pic. Burgund.
" Diachylon. āā ʒss.

The mass should be spread uniformly on chamois leather, and sprinkled with six, eight, ten, or twelve grains of tartar emetic according to the age of the child. This plaster applied within the first week of the attack, constantly produced, in the course of twenty-four hours, active rubifaction and the development of small pearly pustules, and occasioned a marked abatement of the number and violence of the paroxysms of coughing and vomiting. *Lancette. Francaise and N. A. Arch. Med. and Surg. Sci.*

Lactic acid as a medical agent.—M. Majendie thinks that as lactic acid is one of the efficient agents in the dissolution of the food in the stomach, that it might be employed with advantage in dyspepsia, or in cases of simple debility of the stomach. With this view he has administered it both in the form of lemonade and pastilles :

Lactic Lemonade.	R.	Liquid lactic acid	ʒi—iv.	
		Water,	lb. i.	
		Simple syrup,	℥ij.	M.
Pastilles of Lactic Acid.	R.	Pure lactic acid,	℥ij.	
		Powdered sugar,	ʒi.	
		Gum tragacanth,	q.s.	
		Oil of vanilla,	gtts. iv.	

To be made into pastilles weighing half a drachm each, which should be kept in a close vessel. As many as six of these pastilles may be taken in twenty-four hours. *Ibid* and *Ibid.*

Hydrosulphuret of lime in Itch.—M. Lutens has used the liquid hydrosulphuret of lime as prepared by M. Deherde, with great success in the cure of itch. It is made as follows : Take one part of sulphur, two parts of sub-carbonate of lime, and nine parts of water, boil them in an earthen vessel to complete saturation; then decant the liquid and filter. Frictions with this fluid are to be employed three times a day, an ounce and a half being employed at a time. The fluid is transparent, of a deep brown colour, and has the odour of sulphuretted hydrogen. When rubbed upon the skin, it leaves an orange yellow stain, which disappears in a few hours. On the first day it produces considerable itching, and all the pustules become cauterized as if with a strong acid, but no excoriation or exfoliation of the cuticle is produced, if common care be taken.

Bull. Med. Belge et Ibid.

Anhydrous formic acid.—M. Liebig states that an anhydrous formic acid may be obtained by decomposing dry formiate of lead by sulphuretted hydrogen. This acid is extremely corrosive, far more so than concentrated sulphuric acid; the most minute drop when applied to the skin produces the sensation of a red hot iron, and causes the formation of a vesicle and finally of an ulcer that heals with great difficulty. It crystallizes

at 32° F., and boils at 212° F,: the common acid boils at 218° F., and crystallizes at —5° F.

Test for Hydrocyanic acid.—Mr. Barry of London is of opinion that the nitrate of silver is the most delicate test for the presence of hydrocyanic acid, detecting the ten-thousandth part of a grain. The application is very simple. The suspected fluid is to be slightly acidulated by the addition of acetic acid. If an excess of acid be present it is to be not quite neutralized by carbonate of soda. Two or three drops are then put in a watch glass, and immediately covered with a plate of glass, whose under surface, to the breadth of a pea, is moistened with a solution of nitrate of silver, formed by dissolving one grain of lunar caustic in 100 grains of distilled water.

If the inverted drop of the silver solution retain its transparency, the absence of prussic acid is established, for had it been present, the test would in a few moments have become clouded by the formation of a white precipitate, an effect which indeed is almost instantaneous when the prussic acid is not excessively diluted. If, on the other hand, the precipitate appeared, the conclusion must not be drawn, that it is cyanuret of silver, until identified as such by two properties; first, its speedy resolubility, as denoted by the cloudy drop becoming clear when placed over a vessel of caustic ammonia, in which respect it differs from the silver compounds of iodine and bromine; and secondly, in retaining unchanged its pure white colour after exposure to the sun's rays or to a strong light. As this property essentially distinguishes it from the compound of silver with chlorine, it is important to establish it by a separate experiment, upon a somewhat larger portion of the precipitate, which should be obtained by candle light, by successively placing the inverted drop of nitrate of silver over renewed portions of the liquid in a saucer; as soon as the precipitate separates into distinct and like particles, it is ready for exposure to the sun's rays.

Another property which distinguishes the cyanide of silver from the chloride, is, that upon being ignited in an open glass tube, the cyanogen burns with a flame of the usual colour, leaving the metal pure, if sufficiently heated, a quality the more valuable as it furnishes an index to the proportion of prussic acid it represents, which upon ordinary occasions may be estimated as equal to one-fourth the weight of the residual silver.

Philos. Mag.

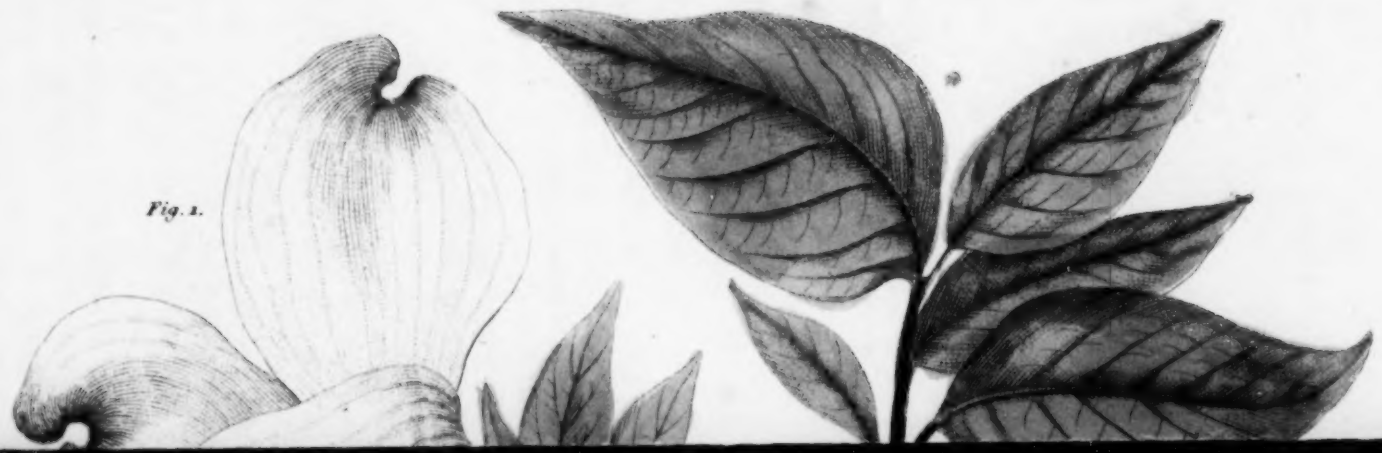
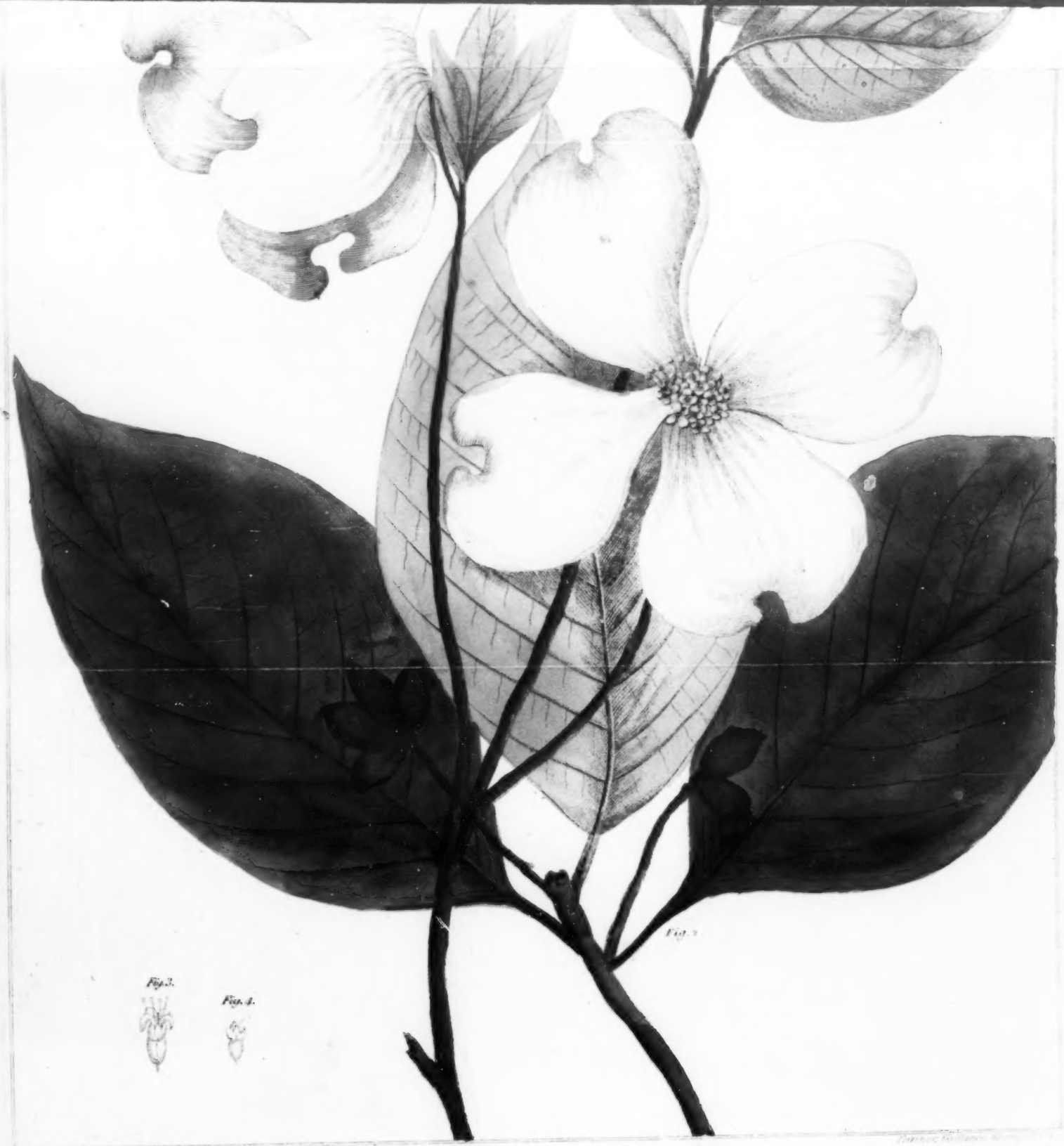


Fig. 1.



CORNUS FLORIDA.

(Dogwood)